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ADVANCED MANAGEMENT

NOVEMBER 1954

VOLUME XIX NO. 11

In This Issue . . .

How Responsible Can Management Be?
Alexander R. Heron

Operations Research: Past, Present and Future
Philip M. Morse

National Standards In Industrial Administration: Part I
Dickson Reck

How Comprehensive Are Your Management Development Plans?
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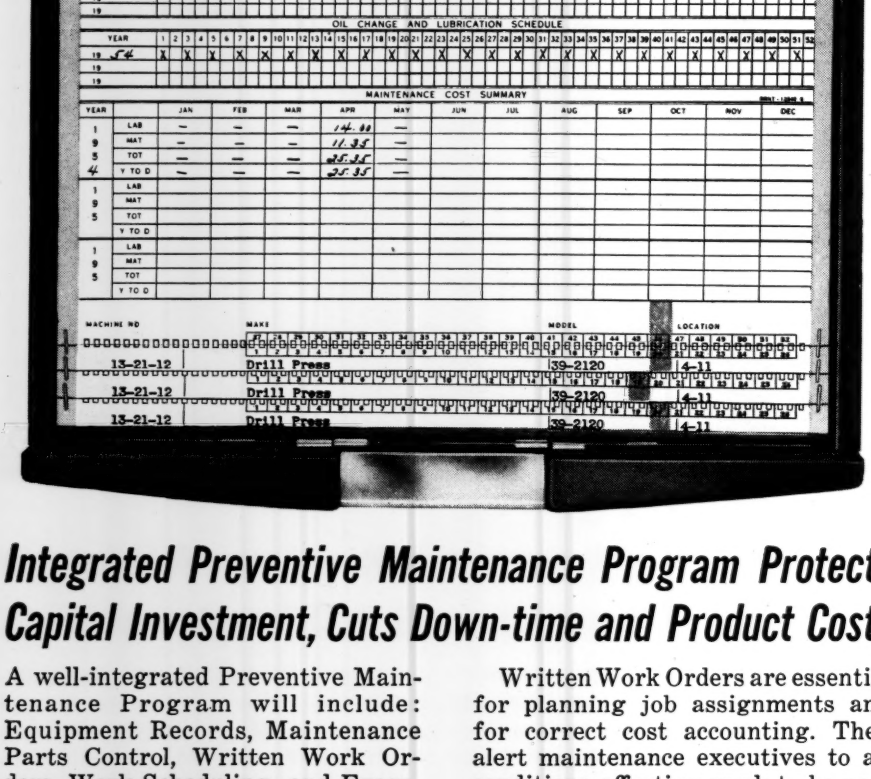

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CONTENTS

Editorial 4
by George B. Estes

How Responsible Can Management Be? 6
by Alexander R. Heron

Operations Research: Past, Present And Future 10
by Philip M. Morse

How Comprehensive Are Your Management Development Plans? 16
by Joseph M. Trickett

National Standards In Industrial Administration: Part I 19
by Dickson Reck

Chapter Activities Chart 24

From Where It Counts . . . The Chapters 26
SAM Awards for 1953-54

Where Are Our Future Top Managers? 28
by Bruce Payne

Reward: $1,000 Per Hour 31

New Management Writing 34

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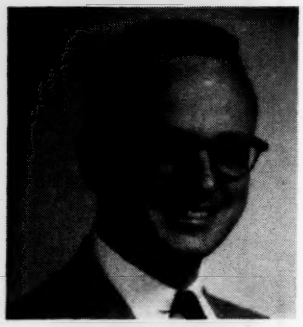


George B. Estes,
President, SAM

"The Farm Boy Can
A Few Months, ake
The City Boy To Learn ou

THE above quotation, popular fifteen years ago, states a homespun conclusion the implications of which are evident in a strong trend throughout a great part of modern management. This trend is away from specialization and toward versatility in the development and performance expectancy of executive qualifications.

The farm boy, generally speaking, grows and matures in an environment wherein he must face and solve a broad miscellany of the basic components of life's routine problems: personal, social, economic. His cross-sectional experience, seasoned with healthy emotional maturity, tends to focus swiftly and effectively, and in an integrated way, upon the somewhat compartmentalized problems of city living. His city cousin, however, moving to the farm, has a much longer row to hoe. Any move from the specific to the general tends to be much more difficult than the reverse. One reason is lack of sufficient experience and knowledge to be integrated and used in the analysis and solution of new problems. Another is total inapplicability of the previous specific.

Many companies (generally those with fewer than eight thousand personnel) have reached the conclusion that versatility of executive ability is an economic necessity rather than luxury. Not all such companies can afford staff and service groups to handle specialized functions. They have discovered that they must either hire versatility or else train toward it. The alternative is loss of competitive advantage.

Nationwide realization of this fact is gradually putting new dimensions to the role of top executive. The day of the top executive who is a specialist in one product, type of product, or one phase of management is past for a large segment of our manufacturing structure. A very good working knowledge of the basic governing functions such as production control, cost control, quality control, and the separate types and applications of these, has become part of the personal qualification he must bring to his post. He has been forced slowly but surely to move from the specific to the general; from the city to the farm.

Over and beyond a very personal knowledge of control functions, the top executive's "tool kit" is gradually enlarging to include a working knowledge of two or more types of manufacturing. World War II demonstrated the need of this qualification. Many plants in that period, undertaking the manufacture of additional products, found their company specialists totally inadequate for the problems inherent in these new products. In most cases the solution was to hire supervisory personnel whose experience and training were sufficiently varied to deal successfully with the manufacturing problems of the new product without dislocating or destroying the manufacturing procedures of existing products. In many other cases, however, the solution was found right within the plant. It was found (with due amazement and joy) among non-specialist personnel, men and women whose training and occupational experience were equal to the new needs. Versatility had once again come into its own.

Development of well-rounded executive ability is by no means a rose-strewn road. In large degree it involves at least as much willingness and determination to learn the broad essentials and solution of a problem as readiness to delegate this task to specialists. The executive is a much better executive, competitively speaking, when he does learn these things and integrates them into his wider field. Such an executive can (and sometimes must) serve as a corrective or guidance factor for the specialist whose concentrated training may be a limitation in the development of new products or the handling of new problems.

Companies faced with the economic need of executives whose broad knowledge is sufficient to coordinate and at times correct the work of specialists have the choice

earn About The City In

akes A Lifetime For

out The Farm."

either of hiring such men or else training incumbent executives to this point of proficiency. Each course of action has its own frustrations. There are just not enough executives of such qualification to meet the demand. Formalized training of incumbents is equally a problem. Not all companies can spare their busy executives long enough away from the job to acquire the desired versatility, the desired rounding-out in specialized areas. What, then, can be done where the need exists?

The best answer lies in our own SAM Chapter activities. The Chapter meetings themselves afford the busy executive an excellent opportunity and, on a person-to-person basis, to learn first-hand the skills and mechanics of every phase of technical and non-technical management. The planned activities of our Chapters are one of the strongest forces in our country for executive development, better management and a happy economy. Such activities are planned to fit the specific needs of individual members and the needs of business generally in the local area. Many Chapters, for example, arrange plant visitations so that executives from one plant have opportunity to see and learn about techniques, problems and procedures in other companies.

Outside the local Chapter, the SAM national conferences act as a clearing house where executives, staff specialists and others with any degree of managerial responsibility may, in a few days, see and hear the latest developments in numerous phases of management.

Our Society is a growing, dynamic organization. Its keynote is progress. In accord with this policy it is studying steps to undertake an additional service calculated to heighten our contribution to executive growth and expansion in the science and art of management. This service is a seminar program. The need and acceptability of such a program has already been demonstrated. The harvest, however, is still very white.

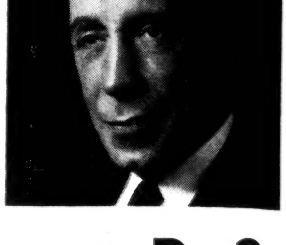
A tremendous service lies ahead for each Chapter and the Society as a whole. The future holds strong challenge and unlimited potential for each Chapter locally and for the Society nationally. We can and will meet this future with the same resoluteness and solid success of the past.

It is wonderful to be able to get back into the Society's activities, now that I am recovering rapidly.

I wish to take this opportunity to thank the other officers and the members who were so thoughtful while I was in the hospitals.

We owe a vote of gratitude to Dr. Bradshaw and to the other officers for their yeoman service in picking up the reins while I was away.

George B. Estes



ALEXANDER R. HERON, in addition to serving as vice president in charge of Industrial Relations, Public Relations and Personnel of the Crown Zellerbach Corporation, is also a Director and Member of that firm's Executive Committee of the Board of Directors. Mr. Heron's career in education and management covers a wide area. He also served as a Colonel in the Army of the U. S. during the war and is widely known as a lecturer on Industrial Relations and Management

How Responsible Can Management Be?

by Alexander R. Heron
Vice President
Crown Zellerbach Corporation

What is private management responsible for and what is its penalty for failure? Referring to management in the broadest sense of the word —the entire group that constitute private management in the American economy—Mr. Heron offers some striking answers in this article which he gave as a talk before the California Personnel Management Association

It is about the two long words in this title that I would like to offer some suggestions. The two words *Responsible* and *Management*. How responsible can management be? Responsible is a word we could study for a long time. It has a variety of meanings, depending upon our approach to it and upon the surroundings. We sometimes speak of a person being charged with a certain responsibility. At other times, we try to help another to develop a sense of responsibility. We use the word "responsible" rather carelessly sometimes when we mean "dependable". I suggest that you put into your thinking the meaning of responsibility as it is related to debt, something owed, an obligation. Then pursue that idea to see what really constitutes an obligation. Is it something we are prompted to do because of conscience? Because of an early family training? Because of an early sense of religious obligation or moral obligation that was drilled into us? We are living in a generation when those precepts have lost their power as a force to guide the behavior of young people, up to the ages of 50 and 60. This is very closely akin to the debt concept of responsibility which I suggest we consider.

When I was a boy, things were right or wrong, measured by two bench marks. First, things were right or wrong because some authority said so . . . Father and/or Mother. They were also right or wrong because of their ultimate consequences — because of the long-range consequences. Right behavior led to a place of ultimate reward and happiness. Bad behavior led to a place of ultimate punishment. I understand that, today, those bench marks have been pretty well lost, too.

A survey line can no longer be drawn proceeding from the source of authority which declares something to be right or wrong to the ultimate point that it is right or wrong in terms of the punishment of hell fire or happiness in heaven. Of the two bench marks, probably the ultimate bench mark was the more important.

We are now talking about management being responsible. Management may be responsible in the sense of being dependable and reliable—of having a sense of obligation. But what is the obligation and how do we define it? Is it a promise we make? Is it the obligation we accept when we raise our hand above an altar? If it is, I think we should have all those promises in writing. Boiled down, it seems to me that we can identify an obligation in terms of a debt, an ultimate effect that will come from either doing or not doing the thing. The responsibility of management I have in mind is the kind of responsibility that had better be met—or else. I am thinking in terms of management as a group, as a class in society, as management in total.

This is a brand new group or class of people, less than two generations old. Management as we think of it today did not exist at the turn of the century. The Nineteenth Century was, of course, the period of the Industrial Revolution, but it was also the period of owner management. The Twentieth Century has brought us the development of the profession of management. Today, ninety percent of the goods and services which come to us in our daily lives are made available through the agency of corporations in our American economy, managed by people who do not own any substantial part of them. The top management groups in all the corporations in the United States own, on the average, less than three percent of the voting stocks of the corporations which

they manage. They are not there because they own the business or because they own controlling interests. They are there because they have been trusted by a large number of people who do own the businesses. To them, personally, management has a responsibility. This group of people, then, is something new in the Twentieth Century. It is this professional management class that is handed a responsibility and is responsible, which has been placed in charge of immense resources and activities, which exerts power over the lives, destinies and welfare of millions of people. Eighty-five percent of us in the United States who are gainfully employed are on someone's payroll. Only fifteen percent of us are self-employed.

The people we call management certainly are responsible to the organization, to the spokesmen for the owners, the boards of directors that put them into their management jobs. That is true in any single corporation. But this group of people who manage the corporations of the United States also have a debt, which had better be paid—or else, to an entity much more powerful that the stockholders of the particular corporations which they serve. I think it is important to remember that the American economy does not belong to the stockholders of corporations, nor to any corporation, all corporations, or all property owners in the country. The American economy belongs to the people of the United States. The people who constitute management in the United States hold their jobs in particular companies because the board of directors has selected them to fill those jobs. But they hold their jobs as managers of the American economy because the people of America still trust private management to operate the American economy.

New Demands Placed On Private Management

If that appears to be a trite and simple statement, reflect upon the fact that when you leave the North American Continent, there is no other place in the world where that condition exists today. There is no other country in the world where the economy is entrusted to private management. We have gone through a long period of movements toward the left, through one step after another that seemed to be leading along the road toward a degree of socialism. Yet, when you add up all the movements toward the left, toward socialism, the social security, labor relations, wage and hour, SEC and the other laws that have irked or inspired us through the last twenty years, you still must conclude that the American economy is still entrusted to private management.

I have tried to identify what I mean by responsible and who I mean when I talk about management. Being responsible means to me facing the fact that we must perform certain obligations, meet certain requirements, discharge certain of these things which we call responsibilities "*or else*"—certain consequences. What I believe we are facing in America, in that "*or else*" is simply this: If private management does not meet the essential demands which our nation places upon its economy, private management will lose the job of managing the economy.

Scope Of Management Responsibility

What are these demands? What do we, as a people, demand from our economy? We expect an adequate supply of goods and services to meet our daily needs. We expect an increasing supply of goods and services to provide us with a higher standard of living. We expect a distribution of the ability to acquire goods and services sufficient that each of us, in increasing measure, can reach toward the upper level of a standard of living which we consider nationally acceptable. In order to accomplish these things, to enjoy that adequate supply of goods and services, to have in our hands the purchasing power to entitle us to our respective shares of the supply of goods and services, we expect jobs. The forefathers of the country wrote certain precepts into the Declaration of Independence. They rested their case on certain inalienable rights: rights to life, liberty and the pursuit of happiness. With the complications of our industrial society today, it is not stretching the point to say that the basic right, the right to life, can be interpreted to mean the right to a job . . . the right to a job through which to earn purchasing power, and the liberty of decision in buying a share of the goods and services which constitute the American standard of life.

Whoever is trusted to run the American economy is expected to operate it in such a way that there is an adequate supply of goods and services to meet our needs . . . an adequate supply of new goods and new services to provide a continually rising level of living . . . an adequate distribution of purchasing power to absorb and use the products of the economy . . . and, as one acceptable channel through which purchasing power may be distributed, an adequate supply of jobs through which each of us may make a contribution to the needs of society as a whole and from which we may receive, in return, a share of the purchasing power with which to buy our share of these goods and services.

That is my interpretation of the big, the social, the inevitable responsibility of this class which we call management.

All of us consider ourselves part of that class. We bow to the president of the company, pay our respects to the board of directors, throw kisses at the stockholders, frown at the tax collectors, scowl at the union representatives, but when we are all through, our ultimate responsibility is not to any of these people. Our ultimate responsibility is to all the people of the United States. In every country in the world, outside the North American Continent, the people have taken away from private management, to a greater or lesser degree, the right to run the economy. The right has also been removed in certain activities on the North American Continent where private management has failed to discharge its responsibilities. In those areas where private management has not been adequate to meet the demands of society upon the economy, it has been shouldered to one side and government management has stepped into the breach. If we fail in our operation of the economy, government management will be the answer. We have been through some failures and some near failures, but it is not my purpose to defend private enterprise nor to offer explanations for some of management's past failures.

Management Faltered Twenty Years Ago

However, two of our unhappy memories should be recalled. A little over twenty years ago, private management failed to provide an adequate supply of jobs in the United States so that all the

people could have their share of the goods and services that constituted an adequate standard of living. Government management stepped in and did a very bad job; but they did supply jobs of a kind, which, we pray may never be repeated. If private management ever fails again on a wholesale scale to provide enough jobs for the people of America, government will shoulder private management out of the business of providing jobs.

In another area, for many good reasons which justify the results, private management has failed to provide an adequate supply of low-cost housing for millions of our people. To a large extent, it has been shouldered out of the business of providing and owning the low-cost housing which a large number of our people need.

Management Survival Depends On Shouldering Responsibility

Government cannot create jobs by issuing fictitious money and distributing it to people for doing fictitious tasks. That does not last very long. Neither can private management create jobs by wishing for them, nor can it go even as far as government can go in creating fictitious jobs. If unemployment becomes a serious problem, private management is not going to solve the problem by requiring a *swamper* on each taxicab or an assistant driver. That would create a lot of jobs, but they would be fictitious jobs. No one can create real jobs by wishing for them, ordering them, or by rubbing a magic lamp. There is only one way in the world by which any job has ever been created and that is by selling the product of that job to a willing customer. In the last analysis this is true of the real jobs which government creates. They are created because a public project of some kind has been sold. We may be entering upon a mild experience sufficient to teach us the lesson which I believe is in store for us.

We may be moving into a situation where private management will be faced with its responsibility of providing an adequate supply of jobs. If we are faced with it, there will be one group with a philosophy somewhat antagonistic to private management, which will run to Washington and to every state capitol for relief measures to cure the evils of unemployment. There will be others—representatives of private management—running to Washington for emergency measures in the way of credit, manipulations of the money market and tax relief. Not being an economist, and never having met two economists who have agreed on any economic doctrine between themselves, I am tempted to ignore both paths.

To find a cure for recession or a threatened depression, I am inclined to pin my faith on the one path which seems to me capable of creating jobs, and to post a road sign marking it "*THE* Responsibility of Management". I am determined to talk and write and repeat to my friends my belief that the responsibility of management, in a crisis, a recession, or in a period of prosperity is to sell the services of 60 million American workers in the form of goods and services to people who want to buy them. Having done that selling, the jobs have been created. When the jobs have been created, the purchasing power has been created and distributed to pay for the sales. There will be no jobs created by a reduction in the stockholders' tax, by an increase in the exemptions, by any one of the list of twenty remedies that will be proposed for legislative enactment or administrative discretion. There will be no cure except as management accepts the responsibility that it has never acknowledged in the course of the last fifty years. Private management, while it runs the economy, has the responsibility of providing jobs for everyone who is able to work. Attach to that the equally obvious fact that management cannot create jobs except by selling the products of jobs to people, who in the long run, own the economy. How responsible can management be?

Responsibility Of Management—To Be Creative

Management can be mortally responsible . . . responsible in the sense that it will lose its life as management if it does not meet certain obligations imposed upon it, certain debts, payment of which is required of private management in return for the privilege of managing the economy. That responsibility is to create and maintain full employment in our economy, not by magic, legislation or tax reliefs, but by selling.

* * *

Audience Questions Colonel Heron

Question: We've had many improvements in machinery and methods that always take away jobs. You named the list of twenty suggested remedies. I'm wondering if there isn't a dual responsibility here because a number of our people are in unions and are hoping for the shorter work week. Is that in your mind as part of the twenty?

Answer: Yes, but it would take too much time to argue out here just how much shorter. My first hourly paid job paid me either 18 or 20 cents an hour for a 12-hour day, 6 days a week. But I was lucky and was eventually allowed to work an extra 2 hours every day at the same rate. That was 84 hours a week for quite a while.

I read recently a pronouncement made in about 1900 that "the threatened arrival of the 5-day week would fatally undermine the very foundation of our American economy". But it hasn't. The work week that has gone from 70 to 40 hours and, for many trades, to 35 hours, has made better customers out of those 35 hour workers during the leisure time they have. They have become the market for an immense amount of increased production of goods and services. You mention the technological improvements that eliminate jobs. It is not on my list that management should avoid technological improvements in order to avoid reducing the number of available jobs. In your company and mine, we've had a lot of improvements and expect to have many more. But every year we have more employees than we had the previous year, before we spent 10 or 20 million dollars on such improvements. We expect this to continue.

Perhaps the shorter work week is part of the improved standard of living to which we look forward. Perhaps there's a point of absurdity at which it should not be shortened any further; but, so far as it has gone, I look upon it as an addition to our standard of living. Everything we add to our standard of living is a selling achievement, too, because the enjoyment of an additional value is something people have to buy.

I suppose fully fifteen percent of our employment in California is directly and solely brought about by the fact that the average wage earner and salary earner in California has two days off instead of one.

Question: Where are we going to go on the guaranteed annual wage?

Answer: We need a half-day's session on that subject alone. In the first place, in an industry where private management meets the responsibilities about which I have been talking, you have guaranteed annual employment without anything in writing. In an industry that could afford to sign a guaranteed annual wage contract, there is the stability of production and sales and planning which make it possible to sign the contract. No one demands it in that kind of an industry. It has never even been suggested, directly or indirectly, in the pulp and paper industry. The place where it is demanded, in one form or another, is in the industry that just hasn't learned how to stabilize its employment and perhaps, because of social demands, can't do it. I'm more worried about the ways in which we are going to meet the demands, in the coming year, in the name of guaranteed annual wage, which are nothing of the kind, but rather a supplementary unemployment compensation deal. Twenty-five years ago, we would have thought taxing the consumer extra money to be set aside to pay men for not working was simply and utterly impossible. But we've lived through it and it has now become a stabilizing factor in our economy. We are now facing a period in California when the maximum unemployment compensation goes from 25 dollars to 30 dollars a week. The government of Michigan has just signed a law which is a terrible mixture of unemployment compensation and family relief in which the basic unemployment compensation is 30 dollars plus 2 dollars for each dependent up to a maximum of 42 dollars a week. The man with 5 dependents, out of work, draws a maximum of 42 dollars a week. But I think they'll live through it, although I feel it's an unfortunate thing that they have mixed unemployment compensation related to a man's earnings with relief, the third dimension being the size of the family.

If we're going to meet these issues and solve them as we go along, I hope we will be able to look back and find that we haven't made any fatal mistakes and that we have been able to absorb the costs and distribute the purchasing power to the customers to pay for these expenses.

As far as guaranteeing the man a year-round job at picking cherries in California, which is the ideal of the guaranteed annual wage, I don't see it in the picture. It would not be fair for me to omit adding that I do see, in the picture, a responsibility for management, that has operated its affairs on a rather ruthless, seasonal basis, to take another look at the cards and straighten out before some unfortunate pushing aside of private management takes place. This shouldering out of private management can take place little by little. Every time a decision is taken out of the hands of private management and put into the hands of governmental bureaucrats, private management has lost that amount of its authority to manage the economy. END

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PHILIP McCORD MORSE, Professor of Physics at MIT, is a member of the board of trustees of the Rand Corp., has served as director of Brookhaven National Laboratory; director of research, Weapons Systems Evaluation Group, Office Secretary of Defense; Director, Operations Research Group, U. S. Navy. He was the first president of Operations Research Society of America. He is the holder of the Medal For Merit, and has authored many scientific papers and magazine articles on science

Operations Research: Past, Present And Future

by Philip M. Morse
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Operations Research, like any other branch of science applied to industry, does not pay off quickly. Its full value is realized only when the studied operations are thoroughly understood, and this takes time. This article, presented as a speech by Dr. Morse at the January 1954 SAM Conference, is the first of a series on Operations Research

THE Operations Research label has been applied to a wide variety of activities, many of which don't seem to be very much related to each other. If this causes confusion, it is not surprising. Anyone with a reasonable amount of skepticism *should* be confused when first getting acquainted with Operations Research.

In fact, anyone with a reasonable amount of skepticism should be confused when first getting acquainted with *any* scientific activity. What is a nice tidy definition of physics or of chemistry, for example? What is the difference between a chemist and a physicist. Several different kinds of scientists can appear to be interested in the same thing. Take a cup of coffee. A Physicist could be interested in the ripples on the surface of the coffee. He might wish to find the relationship between these ripples and the vibrations of an atomic nucleus just before it disintegrates, for example. The chemist certainly could be interested in the relationship between the smell of the coffee and its temperature as an indication of the relationship between the molecular structure of the aromatic esters in coffee and their vapor pressure curves. And the biologist can also be interested in this cup of coffee; after all, the coffee bean is a part of the reproductive processes of the coffee tree, and there are good biological reasons why many reproductive processes are accompanied by perfumes and strong flavors.

Of course, the management-type person can also be interested in this cup of coffee. He can come along and — drink it.

What is just as confusing, a single science seems to be interested in a wide variety of seemingly unrelated things. Physics included acoustics, the theory of metals and also the theory of the atomic nucleus, for example, and mathematics covers an even wider range of rather unconnected topics.

At any rate, logically-minded persons can ask why label a part of science physics and another part chemistry? Why not call this man studying the cup of coffee just a "man who prefers to think about the coffee in front of him rather than drink it"? Why try to enclose a part of the study of the world around us by one label and differentiate it from other parts? Such labels always cause confusion at first, I know. I was a physicist a good many years before Hiroshima. In those days when you told someone you were studying physics, you could expect him either to blush or to smile hesitantly as though he had heard a joke he didn't quite understand. It's quite different now, of course. Everyone knows that a physicist is a person who knows all about the H-bomb.

But labels of this sort do turn out to be handy things even if they are confusing at first. It seems useful to have a few people around who prefer to think about the cup of coffee rather than drink it, so useful that it is worth while catching them young and training them to think about coffee. The labels help us catch them and train them. They divide up science into areas large enough so that the resulting trainees are not too-narrow specialists but yet not so large that the student becomes a superficial dilettante.

The labels serve also to unify the thinking of each area of science and so to help its progress. The area of physics, for instance, includes the basic knowledge behind radio and radar transmission, that behind the technology of metallurgy and that behind the nuclear reactor. These are quite different areas

of application; problems in the work-hardening of alloys don't seem to have much in common with problems of beaming a signal half-way around the world or with problems of keeping neutrons from flooding a control room. But electromagnetic wave theory and the theory of metals and the so-called age-theory of neutron diffusion have many concepts and techniques of analysis in common. Advances in one often suggest advances in the others and every expert in one of these fields is a better expert if he knows more than a smattering of the others. In a very real sense this is an age of integration of scientific knowledge as well as one of specialization.

Operations Research—A Catch-all

It is not surprising therefore that there is a present urge toward integration of the scientific study of the operations of industry, government and the military. Narrowly specialized techniques of efficiency engineering, of quality control and of production planning are being cross-fertilized by the application of more powerful methods of analysis. Methods developed in physics, psychology and economics are illuminating many problems which hitherto had seemed unconnected and are pointing the way toward more powerful techniques of solution. The introduction of the term "Operations Research" has served to emphasize this tendency toward integration and has called the attention of other scientists to this new field for research effort. Even if the integration should go farther and Operations Research should later be absorbed in some larger synthesis, I feel that the word Operations Research is now doing a useful job by symbolizing the essential unity in the study of the operations of men and machines.

As with any newly developing area in science, we can't expect very impressive practical applications right off. The first task of operations research is to pull together the component specialties and techniques, to devise more general mathematical and experimental methods of analysis and to build up well-tested theories relating each operation with other aspects, operational, physical and psychological. You have heard, today and yesterday, about a number of applications of operations research, some of which have been quite successful. I feel that these results are only implications of more wide-spread and more basic successes which will come later, after our understanding has deepened and our analytic tools have been sharpened.

I doubt whether the delay from initial study to final application can be as long as it is in the physical sciences, however. There can never be the same physical separation between fundamental research and applied research in operations research as there is in physical science. Operations research studies operations, including men and equipment, and most operating groups cannot be carried off to a separate laboratory for study, they must be studied on the spot, in the factory or wherever they are in action. In order to observe or carry out experiments, the operations research worker must work closely with the administrator in charge of the operation and so get acquainted with his practical needs and worries. Therefore even if the immediate goal of the operations research worker is an increase in fundamental understanding or an improvement of the mathematical model describing some operation, his close contact with the executive will make him aware of immediate needs and so will produce practical applications from the start. All I wish to indicate here is that operations research, like any other branch of scientific research, doesn't always pay off quickly; one should not expect full returns from a new operations research team in a few months, or even in a few years. The team's full value will come when it really understands the operations it has under study, and true scientific understanding is not arrived at quickly.

Unifying Influence Of The Mathematical Model

But to get back to this integration of methodology and the basic concept of operations research. Waiting-line, or queueing theory, is a good example of the unifying influence of the use of the mathematical model. Most of the concepts of waiting-line theory arose in the study of the telephone exchange, more than twenty years ago, but for a long time they were used only to work out the requirements for new telephone switchboards. Only recently since the introduction of the concept of operations research has induced the study of operations in general instead of each operation separately, has it become apparent that waiting-line theory applies to automobile traffic, to airplane landings at a large airport, to customers in a chain store and to many production lines as well as to telephone switchboards. In fact it is becoming apparent that waiting-line or queueing theory will contribute to the understanding of any operation wherein units arrive at an irregular rate at some point, whence they are "serviced" or passed on to some other point at a different rate.

Central Problem Of Waiting Line Theory

Unless the mean service rate is greater than the mean arrival rate a waiting line, of units waiting to be serviced, will be formed and will increase in length continually. But even if the mean service rate is larger than the mean arrival rate, the waiting line is not abolished unless both arrivals and service operations are regularized, not random. A central problem of waiting-line theory is to calculate the relationship between the mean length of waiting line and the degree of randomness of arrival and disposal. On it can be based estimates of the optimum capacity of the servicing facilities when one balances the cost of letting the unit wait in line against the cost of increasing the service rate. These calculations are not very difficult if both arrivals and servicing takes place in a purely random manner, as in the case with people coming into a store from the street.

Having made the calculations, we can proceed to apply them to a specific operational problem by first determining whether arrival and service are, in fact, random. For example, the arrivals and dockings of ships in harbor seem to be close enough to random to apply the simple theory, unless ships are routed in convoys; aircraft arriving at an airport come at random unless especial efforts are made to adjust their speeds during the half-hour preceding their arrival.

Next, one has to compare the cost of having n units waiting in line against the cost of increasing the service rate. It the ratio of arrival to service rates is small, there is no great amount of time lost, but if the facility gets popular and arrival rate begins to approach the service rate, the waiting line increases rapidly in length and money must

either be spent to increase service or an effort must be made to reduce or to schedule arrivals. Administrators not familiar with waiting-line theory can make wrong decisions, with serious consequences, in such cases. Not so long ago, a shipping firm noticed that one port was somewhat more efficient than two others and decided to route all its ships to the one port. This had the effect of increasing the mean arrival rate up to 0.9, the service rate for that port, and of increasing the mean waiting time threefold. Management misinterpreted the resulting considerable delay, attributing it to a sudden decrease in efficiency of the chosen port. When the theory was worked out, it was apparent that the increased delay was entirely due to the increase in arrival rate, not to a deterioration of service, and that the diversion of a few ships to the less efficient ports would reduce the waiting line considerably. In other words, a small use of the less efficient ports would produce the best results overall. Subsequent experience bore out the predictions.

In the case of aircraft stacking over airports, in bad weather when landings take time. it was hoped that careful scheduling of aircraft arrivals would materially reduce the line. Computing the effect on the waiting line of changes of randomness in arrivals and landings is a difficult mathematical problem. Preliminary analysis indicates that if arrivals are completely regular, each an equal time after the next previous, but if servicing is still purely random, then the mean queue length is about half that predicted for the case of both arrivals and landings are "partially random" in the cases where scheduling of flights and landings is attempted. No matter how hard they try to stick to schedule. some randomness creeps in.

Procedure Known As Monte Carlo Technique

To solve this problem, a procedure known as the Monte Carlo technique was employed. By the use of a table of random numbers and of empirically determined probability distributions for scheduled and non-scheduled arrivals and for landings, a whole series of virtual arrivals and landings could be worked out on a high-speed computing machine, which would have the same statistical properties as actual plane arrivals and landings. Instead of using planes and landing strips to get the figures, the electronic computer could be used to reproduce the essential elements of the problem and thousands of cases could be run off in a short time. The results do not have the elegance of generality of an analytic solution but they have the advantage of being numerical answers corresponding to the case of interest. They give, in an afternoon, data equivalent to several years of counting and timing at an actual airport.

Analysis of these Monte Carlo calculations indicate a small reduction of queue length with improvement in scheduling arrivals. Finally it is then possible to find out whether any practicable procedure for tight scheduling of plane arrivals would or would not cost more than would be gained by the calculated reduction of delay time.

How Industry Is Using SAM Rating Films . . .

- **Reduce time, cost of time study training**
- **Select trainable applicants at Personnel**
- **Strengthen union's confidence in time study**
- **Reduce, expedite grievances**
- **Increase rating skill and consistency**
- **Build standard data**
- **Derive predetermined times**
- **Set new standards, audit old ones**
- **Explain philosophy of time study technique**
- **Help company make its own films**

Observation—And Building A Hypothetical Model

Perhaps by now you can see the parallelism between the study of waiting lines and the study of some physical phenomenon. In both cases one abstracts from the complexities of the specific case the typical aspects which are to be correlated with some mathematical model. From the model, the hypothesis which one fits to the data, one can learn the interdependence of these aspects and can begin to understand the phenomenon. At first the model is very crude, including only the few most outstanding aspects, but as understanding grows, the model can be complicated to the extent needed to work out cases of practical interest. In neither physics nor operations research is the research a purely statistical hunt for correlations, by taking data and calculating cross-correlations, or using the chi-squared rule. Observation and hypothetical model-making go hand in hand. As pointed out in many recent books on the scientific method, there is a very close relationship between the progression from tentative hypothesis to final theory and the growth of what we call scientific understanding.

In the case of waiting-line theory a great deal of elaboration is possible to fit specific examples. In many cases there are several parallel service facilities, each of which can draw from the waiting line: for example, the several toll lanes across toll highways or the several docks in a port. In a

production line or a traffic network, there may be a sequence of bottlenecks, the waiting lines being in series, with the randomness of output of one affecting the arrival rate of the next. Some of these cases can be worked out analytically, others must be computed by Monte Carlo techniques. In most cases which have been worked out, the results have helped the executive in charge to understand the possibilities and limitations of the operation he controls, and have helped him make appropriate administrative decisions concerning it.

Applying Linear Programming To Production Scheduling

Many other mathematical models appropriate for the analysis of various aspects of operations, are being developed and applied. You have heard, yesterday, about linear programming and have heard today how it can be applied to the problem of the scheduling of production and the warehousing of various items. In many applications of production scheduling large-scale electronic computers will have to be used to work out specific cases in a reasonable time. Operations research workers will have to become familiar with the capabilities and the techniques of programming these high speed computers, for many of their calculations will be too complex to do by hand.

Incidentally, the utility of the concept of operations research came out last year during a discussion with some oil company engineers. These engineers have been using the methods of linear programming in solving the following problem. The oil company can produce various proportions of fuel oil, gasoline and aviation fuel from their cracking plants, depending on the kind of crude oil they use, and can produce various proportions of these end products from a given crude, depending on the cracking process used. But crudes differ in price and cracking processes differ in cost. Suppose the company has orders for definite quantities of end products to be delivered in the next three months. What amounts of which crude shall it buy, and which processes shall it use in its cracking plants, to produce the required amounts of products at the least cost, subject to limitations of supply of crudes and of output of their plants?

This is a straightforward linear programming problem and the engineers had been doing a good job solving it. The persons who worked out those solutions did not call what they were doing operations research; many of them had not heard of operations research. But neither were these engineers aware that many other problems in the company's operations were also amenable to the analysis. Their training and point of view had been too specialized to see the wider possibilities. The value of the concept of operations research to this oil company lay in making their research men aware that the techniques of theoretical analysis they have been using can be applied to a much wider range of operations problems than they had hitherto conceived, and in showing the company executives that they can use their own research departments to help solve production and sales and distribution problems, where they had not hitherto been used.

Game theory is another mathematical model which is of considerable importance in the analysis of military operations and which may be of use in industrial planning where competition is an important aspect. Communication theory, discussed this morning, is another analytic tool which will be useful.

Optimum Distribution Of Effort

I will mention just one more example of the unification of viewpoint which these mathematical models can bring. It started during the war, in connection with problems of naval operations, as a theory of search. Since the war its application in a number of industrial cases leads me to call it the theory of the *optimum distribution of effort.* Its naval aspect concerns the operation of search for an enemy vessel, or submarine or aircraft. The enemy is somewhere in a given area of the sea. How do you deploy your aircraft to find him? The connection between the mathematical model and the actual operation is the *rate of search.* A single plane can see the enemy vessel (by radar or sonar or visually as the case may be) R miles away, on the average. The plane can "sweep" out of a band of width 2R as it moves along; the picture is analogous to a vacuum cleaner, of width 2R, sweeping over the ocean at a rate equal to the speed of the plane and picking up whatever comes beneath it. An area equal to the speed of the plane times twice the mean range of detection will thus be swept in an hour. The sweep rates of planes vary from a few hundred square miles per hour to several thousand square miles per hour, depending on the plane, the radar equipment and the vessel searched for.

Problem Of Allocating Search Effort

If the enemy is equally likely to be anywhere within a certain area, then the problem is a straightforward, geometrical one. The search effort is evenly laid out over as much of the area as one has planes available. The problem is a little complicated by the fact that detection falls off near the edge of the swept band and there should be a certain amount of overlap between bands to improve the chance of detection near the edges.

But if the chance that the enemy is present varies from area to area, the problem becomes quite difficult, nonmathematical intuition may lead to quite erroneous use of available effort. For example, if the enemy is twice as likely to be in one area than in another, then, if only a small amount of search effort is possible, all this effort should be spent in searching the more likely area; if more effort is available, some time can be spent on the less likely area and so on. A definite formula can be worked out in each specific case. Search plans for various contingencies were worked out by the operations research team attached to the Navy during the war; they materially aided the naval efforts in many cases.

It seems a far cry from planes and ships and submarines to industry and business activities. But the utility of the mathematical models is their wide range of applicability. One possible business application of search theory comes in the problem of assignment of sales effort. Suppose a business has a limited number of salesmen, who are to cover a wide variety of dealers. Some of these dealers are large stores, which will usually produce large orders when visited, some are small stores with correspondingly smaller sales return. If there are enough salesmen, every dealer can be visited every month and the optimum number of sales can be made, although the sales cost will be high. With fewer salesmen available, search theory indicates that the large stores should be visited more often than the small stores; with very few salesmen it

Good Management Is This . . .

Management is not a matter of pressing a button, pulling a lever, issuing orders, scanning profit and loss statements, promulgating rules and regulations. Rather, management is the power to determine what shall happen to the personalities and to the happiness of entire peoples. . . . Executive work, therefore, is statesmanship and the techniques which the executive employs are only incidental to the forces which he sets in motion and helps to direct. It is no exaggeration, therefore, to say that the management of the nation's large institutions, both in business and in government, determines the fate of millions of individual lives as well as the lives of generations unborn.

These institutions, which by some inherent process seem always to expand, create the environment in which most of us live. If we do not use sufficient intelligence, if management is narrow-sighted and stupid, we will find ourselves in a vise. The knowledge needed consists in part of broad principles, such as the rule that authority should usually equal responsibility, or that individual functions and responsibilities must be clearly defined if the most effective use is to be made of organization and personnel. But in addition to these broad principles there must be an understanding of human nature and the techniques which secure ready assent, cooperation, morale, and institutional drive. . . .

Management is not an isolated process, a mere game at which grown boys play. Management is what people do in response to situations as diverse as society itself. Each situation is different, hence each management problem is different. Running throughout all of them, however, are certain general factors and common requirements. The executive who knows what these are and has sufficient native intelligence to mold them into his organization possesses the combination that usually wins the struggle. Throughout the organization the level of performance can never rise higher than the capacity of the man in the position carrying the greatest authority, prestige and influence. Competent individuals are seemingly unable to function at their best when, over long periods of time, they are frustrated and held down by weak leadership. A serious and common mistake among executives is to assume that a weak man in a pivotal position can be bolstered by surrounding him with one or more persons of capacity, making it necessary for several to do what the top man should be able to accomplish alone. Almost without exception this makeshift fails. One reason is that the executive who is not fully qualified for his position seems to be secretly aware of his shortcomings as well as openly aware of his power, hence he attempts to cover up in ways injurious to the efficiency and morale of those who work under him. The weak person is usually the last to admit his deficiencies, however, and because lacking in self-confidence, feels that he must compensate by putting up a front. No executive who puts up a front can hope to have the wholehearted cooperation and respect of those who work for him. ***Excerpted from THE EXECUTIVE IN ACTION by Marshall Dimock, published by Harper & Brothers.***

may be that only the large stores should be visited. If the probable return per visit for each store is known, the optimum distribution of sales effort can then be calculated.

An interesting and typical variation on this problem comes when we consider the action of the individual salesmen, when we try to make their behavior conform to the best over-all distribution for the company. For each individual salesman, with his limited effort, it may be best *for him* to visit only the large stores; if his visits are uncontrolled and if he is paid a flat commission, it may turn out that the large stores are visited too often, the small stores too seldom, for best returns *for the company as a whole.* It then becomes necessary to work out a system of incentive commissions designed to induce the salesmen to spread their efforts more evenly between large and small customers. If the general theory has been worked out, this additional complication can be added without too much difficulty.

This problem of balancing the tendencies of different parts of a large organization is one which is often encountered in industrial Operations Research. It was discussed by Mr. Watson yesterday. The sales force is out to increase sales of all items, though some items may return less profit than others; production resists change-over to making another product, though sales on the other product are increasing; and the financial department frowns on building up large inventories, though small inventories always put the production division at the mercy of sales fluctuations. It is often not too difficult to sub-optimize each of these divisions separately, so each is running smoothly and effectively as far as its own part of the business is concerned. But to be sure that all these parts mesh together to make the company as a whole operate most efficiently requires much more subtle analysis and very careful quantitative balancing.

In the interest of reducing factory overtime and to keep down inventory, for example, it may be necessary to modify the salesman's incentive commissions, so he will be induced to push one line over another. It may be necessary for the production division to allow more overtime in one department than another, to make some part of its operation run at less than optimum in order that the over-all operation be optimum; and one must take care not to penalize the production department, by reduced bonuses or the like, for reducing its efficiency so that the effectiveness of the whole is improved. Solutions of company-wide problems of this sort require all of the techniques of Operations Research and then some. They are not ones for a newly-formed Operations Research team to try at first: But they are problems to head toward. If the team can be of even the smallest help to the top executive in solving company-wide problems, they will have paid their way manyfold.

In tackling such general problems, the Operations Research team is entering the field hitherto monopolized by management consultants. This should not be a subject of concern to either management consultants or to Operations Research workers. There should be very little overlap between the two, for the point of view and background

of the Operations Research worker differs considerably from that of the usual management consultant. The management of a large company's operations is usually a complicated enough problem so that there is room for the help of both types of experts.

Operations Research Uses Many Different Tools

There are many other research tools available to Operations Research than the mathematical model. The model, in fact, should be only one step in the sequence of observation-model-experiment-theory which most scientific investigation uses. Nuclear physics grew from observations of radioactivity and of cosmic rays, from the subsequent hypotheses which were built to account for the observations, from the controlled experiments on high voltage machines which the hypotheses suggested and from the unfolding of the theory, based on the earlier hypotheses and checked successively by experiment.

Automobile traffic might be an example to show how this step-by-step progress can be made. A very large amount of data has been obtained, for example, on traffic through intersections, with and without stoplights. Much of this has been analyzed statistically, and some of the results have suggested a few things to be done to improve traffic flow. But raw observational data is only the beginning of the process. We must get a mental picture of the flow, in a quantitative form, to begin really to understand the problem.

For instance, it has been observed that, when a line of waiting cars starts after the traffic light turns green, the whole line of cars does not start as a unit, first one starts, then the next and so on: A *wave of starting* travels down the line. Some observations indicate that the velocity of this starting wave is nearly the same for any line of cars; it seems to move at a rate of about thirty miles an hour down the line. If a car were travelling in the opposite direction and adjusted its speed so it passed the first car just as it started, the next car just as it started and so on, it would be travelling about thirty miles an hour.

This is an observation about the dynamics of traffic flow, about the overall relation between present car design and human reactions which is worth further investigation. Mathematical models have been set up to take into account this dynamical inertia of traffic, their constants have been adjusted to fit the observed speed of propagation of the starting wave and the other consequences of the model are being worked out. For example, the model indicates that it is possible to have too short a period for the green light; it takes a while for the line to start. Such predictions need to be checked against other observations, of course, to check the model in more detail.

But it also is necessary to devise controlled experiments to give us real understanding of the model. Teams of cars and drivers could be put through the stop-start cycle at a specially devised intersection equipped with full measurement equipment, to see whether training would change the reaction time and whether the mathematical model no longer applies under extreme conditions. Some of these experiments may suggest that certain modifications of car design will change the dynamics or that some of the delay times are directly limited by human capabilities. Following up these leads will suggest mechanical experiments on cars and psycho-physiological experiments on people before we can say we really understand the problem.

Must Continually Check Models With Experiments

Only at the end of such a step-by-step investigation, combining mathematical models and the results of various experiments, can we say that we understand the dynamics of stop-start at a traffic intersection. From this understanding, of course, can come true control of the phenomenon; we can then not only devise an optimum red-green cycle to fit present circumstances, we can also work out what to do if the circumstances change, if for example a greater proportion of trucks were present or what modification should be made for conditions at night or for icy conditions.

So we must be prepared to devise operational experiments in each of the operations we study, to check our mathematical models and to gain deeper insight into the reasons for the equations. Some of these experiments can be done on computing machines, of course, the way the landing schedule of aircraft has been analyzed. Machines devised to duplicate the essential behavior of complex equipment or operations are called analogue computing machines. Some such machines have been devised to duplicate the behavior of waiting lines. Many other analogue computers can and should be built, to duplicate other operational situations: Those arising in production - sales scheduling, in various production lines, in railroad and bus scheduling and in the flow of orders and reports in a large company, to name a few. By their use we can rapidly gain insight which would take much longer to obtain by observation of the operation itself. Continuous check between the actual operation and the results obtained from the analogue computer is necessary, of course, to make sure the computer is really duplicating the essential elements of the actual operation.

Research Teams Will Not Replace Executives

By this time I may have given you the idea that Operations Research is going to make the executive obsolete, that the general manager or the general or the admiral is going to be replaced by a bespectacled operator of an oversized electronic computer. Far from it; I mean nothing of the sort. I should remind you again that "research" is a part of the title and that research is concerned with understanding, not deciding. Having had some experience in management as well as in research I can say that the process of management is inimical to the process of research. I don't mean that the two must be opposed in aims, but I do mean that when a person is bossing an outfit he can't be doing research, and vice versa. Consequently, I am convinced that the Operations Research team can never replace the executive and at the same time continue to do Operations Research. On the other hand, an executive and an Operations Research team can make a most potent combination, the team foreseeing the problems and providing the factual background for decision, the executive adding his experience and intuition to reach the necessary decision. Such close partnership between executive officers and their Operations Research teams is now the usual pattern in our military forces. It is being tried with success in a number of large industrial concerns; perhaps it will become the usual pattern here also. END

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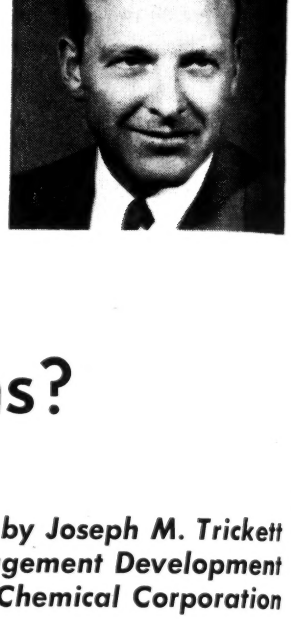

How Comprehensive Are Your Management Development Plans?

by Joseph M. Trickett
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Recent interest in management development has overemphasized techniques and tools to the point that management frequently believes that a set of job descriptions, a selection technique or a system of job rotation makes for a comprehensive management development program. Management development is as much a philosophy as a system, and this timely article warns that management's perspective must grow before development programs can be effective

DO YOU have a Management Development Program? How long have you been carrying out whatever form of management development you do? Why do you give any attention to the development of managers? Just what does your management development consist of? What levels of management are involved? These and similar questions were asked last year within large and small companies in thirty major metropolitan areas from coast to coast. The American Management Association sponsored this comprehensive survey and, with the assistance of about 250 of its members, conducted interviews within the cooperating companies. The results of these interviews have been summarized in a recent publication of the Association entitled "A Survey of Management Development."

During the past five years or so, there has been much written and spoken about management or executive development. Not only have the general periodicals of management contained much of this type of material, but the journals of the specialized, functional areas of business have contained a great deal of information on management-development methods, tools, and techniques. Most of this material has been constructive, but much of it has been from a particular facet or aspect of the overall problem of management development, although usually not so narrowly labelled. This limited, though not-qualified, approach has caused many companies to adopt and adapt the component that was advocated and assume that they had or were doing "management development." It is this kind of embracement, in fact, which has stimulated some observers to point out, sagely, "There is nothing new about management development . . ." and others to query whether such activities are not merely a "fad" or even to imply that management development is only the latest fashion in the management wardrobe.

Of course there is nothing *new* about the development of management personnel, if the subject is approached only from the standpoint of one part or in terms of one or a few of its several components. Thus, there is nothing really new about a university management course, but that alone is not comprehensive management development. There is nothing new about planned job rotation, but that alone is not complete management development. There is nothing very new about in-company classes or about the "multiple management" idea, or about the use of understudy positions, but these. in themselves. do not constitute comprehensive management development.

But there is something new about management development in American business. This is the idea or concept or philosophy that there must be a comprehensive and systematic approach which involves several prerequisites:

1. Recognition and admission, on the part of people in top management, that they each need further and continuing development to meet *today's* management problems.
2. Recognition of the on-going nature of management development, that such activities are not something that begin and end at a given time, that they are inherent in the operation of the business itself.
3. Recognition of the need for some systematic, organized approach rather than previous trial-and-error methods.
4. Recognition and affirmation that development takes place within

each individual *but* that each boss in particular and the organization in general must create the "climate" for such growth; that real management development is the combined responsibility of the man. his boss, and the organization as a whole.

Most Management Development Plans Too Limited

The fact that *management development* does not mean the same things to all people became apparent early in the conduct of the AMA survey. Thus, many companies had been carrying on some aspects of such development for many years. On the other hand, few companies encompassed all aspects of such development in their formal or "official" plans. The larger companies were, generally speaking, inclined to have a broader approach than were the smaller ones—over 75% of the companies interviewed with over 10,000 employees claimed some form of management development, while under 30% of those interviewed with 500 or fewer employees had a planned approach. Also, some type of "organized" approach was a fairly recent development—in the 530 companies interviewed, at least 60% of the plans were under five years old.

When the AMA survey was complete and all data "in", it was easy to see that there were many limitations to most of the companies' approaches to management development. This did not mean that many of the concerns with a rather narrow approach might not be doing a good job; many were doing excellent jobs of management development within the confines of *their* particular approach. It was possible, however, upon an analysis of the data and, particularly of the restrictions or limitations inherent in existing plans, to arrive inductively at some concepts or criteria as to what might constitute a comprehensive approach to management development. These observed interview data have subsequently been amplified by the author through many personal discussions concerning their meanings and implications, in a variety of company approaches. Therefore, for whatever they may be worth, the following are presented as criteria or specifications of management development activities that are comprehensive, complete, or unrestricted:

1. *A recognized and understood reason, purpose, or need for management-development activities.* This objective or purpose should, generally speaking, be in writing and available to all concerned. Thus, less than 80% of those companies interviewed which had some type of management development activity could state a specific purpose or objective of such activity. A few even claimed that such a purpose was "obvious" to all concerned. The diversity of replies by those who could state a purpose, however, indicated clearly that there is certainly nothing obvious about the reasons for such activities. From the data observed, it would seem that no plan or approach could be at all complete, if the target at which it was aimed was so obscure as to be either undefined or undefinable.

2. *A systematic approach.* While it is certainly true that management development is more a philosophy of management than it is a system of forms and procedures, if such activities are to be at all complete, certain "tools" and techniques are necessary. Not only must these tools be available, but there must be some method to indicate *how* and *why* and *when* they are to be used and some means to control their use. There needs to be definite procedures to guide bosses at all levels in the development of their subordinates. Thus, it would seem impossible to provide for comprehensive management development without some way to "inventory" management talents and experience, without some means to appraise, individually, current management results and methods, and without some method to record each individual's developmental needs, both as to present performance and future prospects. These are "bare essentials" in a systematic approach. These tools, techniques, and procedures can be kept simple, realistic, and practical; yet, they are the hallmarks of a planned, rather than a rule-of-thumb, hit-or-miss approach.

Top Executives Should Participate In Plan

3. *Participation by top management.* It has been observed again and again that the management-development activities of some companies were limited because the companies' top managements did not participate directly in such activities. Mere encouragement and sponsorship by top executives is not participation and these in themselves are not enough to provide a comprehensive approach. The top-line executives involved must actively participate in the techniques and procedures involved. This is an important prerequisite for the necessary growth atmosphere which must seep down from the top and can never be expected to well up from the bottom.

4. *Equality of individual opportunity.* All individuals do not need the same developmental treatment, but all should have opportunities for growth. It has become almost axiomatic that it is impossible for a company to grow and develop, over any period of time, unless the people who compose it—and particularly the management people — can grow and develop. A "fair-haired boy" or "privileged-few" approach will not work in American business, although some inadequately informed "advisors" may seem to so advocate. Both our Judeo-Christian ethic and our basic democratic tenets presume a recognition of the worth and potential of each individual. Our management development activities must be consonant with the fundamental ideals of our society. The survey results definitely showed that a great many business organizations fully recognized and accepted the belief that the economic institutions of a democracy must themselves be democratic.

Follow Up Needed To Assure Progress

This is not to advocate equality of treatment. Individuals differ and their development needs and requirements vary widely. Developmental treatment must be geared to the present needs of the individual and to his future prospects. Also, selection and re-selection based on existing and potential ability, is a natural part of organizational growth. Thus, potential presidents should necessarily get a somewhat different development "diet" from that given potential foremen. Although it is this writer's opinion that the parallels, even here, should exceed the divergencies.

5. *Specified action to take place.* Even though objectives are defined and generally understood, with a systematic approach involving widespread developmental opportunities, general development will not take place unless there is some "minimum action" which is prescribed for each level. There must be some established frequencies or "deadlines" for appraisals; there must be some easy way to keep management

inventories up-to-date; there must be some assurance that each individual appraised is actually being counselled and coached by his boss; there must be some way in which supplemental, off-the-job methods and techniques of development can be brought to bear in specific situations. All of this involves a bit of "red tape" and some uniformity of approach. But the tape need not be very red nor very binding, the procedures need not be too rigid nor too time-consuming, uniformity need not become an organizational fetish. We know, for example, that operating managers frequently do not read manuals; hence, we can keep our instruction sheets and control measures simple and direct and easy for busy line people to use. Such "standard actions" are necessary, however, to insure follow-up on conformity. Without some follow-ups as to conformity, management development may be only a general program-name, with little specific action. A lack of some such minimum action was felt by the interviewers to be the case in a number of the companies covered in the AMA survey.

Narrow Subject Matter Limits Executive Growth

6. *Breadth and depth of content.* Overall management development involves much more than a single subject-field. The survey results definitely indicated that complete management development could not be a one-course proposition. Thus, while some general, broad subject (such as *human relations*) may be an important and recurring aspect of management development, mere exposure to such a "course" or subject is not a complete answer. In fact, the subject matter of existing internal and "external" management development courses is so diverse as to preclude meaningful conclusions to be drawn. It may be that there is no actual limit to the subject-matter or content that should be included in a comprehensive approach. Certainly "breadth" is virtually unlimited, with all the functional fields plus the many areas encompassed in the meaning of the term *general* or *liberal education.* Depth of content might be limited by the amount of a particular subject to be included. Thus, there is probably a limit to the amount of *accounting* or *finance* subject-matter which is necessary for successful performance even in accounting or finance. All with whom I have discussed this matter agree, however, that narrow, subject-matter restrictions certainly are inimical to a comprehensive approach to the development of management leadership.

Management Development Must Be Continuous

7. *Breadth and depth of application within the organization.* In many companies, management development has been limited to but one functional department. In some others, it is limited to a particular geographical area within the organization, such as to the metropolitan offices or to the plants. But the most frequent limitation in application was to a particular level of management; sometimes only to "top management", more often to front-line management (foremen). The importance of the management-team as a whole has been stressed much in the last few years, as has the parallel idea that all in management, regardless of level or function, have certain human-leadership responsibilities which are more or less common. Hence, it goes almost without saying that general or comprehensive management development cannot exist when such activities are limited as to function, location, department, or level of management.

8. *Long-ranged and continuous.* It may seem impossible for a management-development activity to meet all of the above outlined criteria and yet not be comprehensive. There were instances, however, where such was the case—where the management-development endeavors were considered to be temporary or short-term in nature: "Until adequate reserves of management replacements have been created. . . ." In other instances, such activities were considered to be "fill-in" propositions: "Something to be carried on during our off-seasons . . ." and interrupted when the busy seasons came around. Real management development is not like a coat, to be put on or taken off at will. If the management philosophy here espoused is accepted, it can readily be seen that management development for an individual begins when that individual is first considered as a potential manager and ends only upon his death, resignation, or retirement. And for the group, such activities must be just as continuous and infinite in duration.

9. *Fixed and accepted responsibility for development* . . . It was indicated above that it has been increasingly recognized that there exists a multiple responsibility for management development: a responsibility on the part of the individual concerned, a responsibility on the part of his immediate superior, and a responsibility resting on the organization as a whole. Perhaps the last two of these responsibilities are aspects of the same thing, yet close observation shows many instances where one of them is fulfilled and the other left unfulfilled. It is not enough that such a responsibility for the organization as a whole be stated as an objective or policy, although this can do much to facilitate an attitude favorable to management development; each boss must understand and assume his personal responsibility for creating the proper developmental climate. Without this climate or atmosphere, no real development can take place. This involves, of course, the assumption by each boss that the development of his subordinates is a regular, continuing part of his regular job and is not an extra-curricular activity to be done when he has nothing more important to do.

Management Development Is Basically A Philosophy

10. *Adequate provision for change and improvement.* Anyone who explores in this new field of management interest is bound to reach the conclusion that there are no final answers as to the best ways to select and develop management leadership. Again and again it was observed that the only real constant was change and a recognition of the necessity for continued change. Therefore, to be genuinely comprehensive or complete it would seem that the approach and methods used must be flexible and dynamic; they must change with the changing internal and external requirements and they must be adjustable to the changing needs of each individual concerned. This does not mean that there need be looseness or lack of system. It does mean that the system and procedures be adaptable to the people and the conditions concerned.

From the discussion of the ten points listed above, it should be apparent that adequate or complete management development is more a philosophy than a system, although there must be an admixture of both. Just how comprehensive are your management-development activities? END

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National Standards In Industrial Administration: Part 1

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Top business executives, although they encourage the use of company standards, frequently exhibit distrust of national standards because they appear to be decisions made by outsiders and imposed upon the company. Many executives, therefore, feel that any growth of national standards is likely to curb individual initiative in company operations. This article, Part I of a series of two, explains how standards buttress decision-making and clarifies the relationship between company and national standards

WHATEVER opinions they hold, executives must deal with the fact that the development and use of national standards are rapidly increasing.

A national standard, as the term is used here, is a standard which (1) presents a solution to a problem common to more than one organization, (2) is designed to be applicable to all like problems which arise in the nation, and (3) is promulgated as being technically and economically the best solution available. By this definition, standards developed by trade associations, scientific and professional societies, federal government agencies, and specialized standards organizations such as the American Standards Association, all are national standards.

National standards organizations, although they began to evolve in the latter decades of the 19th century, received their first real impetus during World War I and grew in number and importance during the 1920's and 1930's. By 1940 there were more than 450 national organizations engaged in some kind of standards work, and during World War II the movement again received a strong impetus. The post-war trends and their importance to business were foretold by a committee of prominent business leaders under the chairmanship of Mr. Charles E. Wilson, then president of the General Electric Company. This committee, in its report to the Secretary of Commerce in January 1945 states, "The Committee believes that standards will have an ever-increasing importance. They will play an expanding role in the fields of engineering and manufactured goods to the commercial field and to many other fields. Thus they will ultimately affect the production and sale of all goods."

Events since 1945 have justified the prediction of the committee. From the beginning of 1945 to 1954 the number of American Standards—those promulgated by the American Standards Association—more than doubled, increasing from about 700 to more than 1400; the number of standards and tentative standards of the American Society for Testing Materials showed a fifty percent increase, from 1255 to about 1900; and the number of Federal Specifications—which take on the character of national standards because they are used not only by the federal government, but by local governments, institutional purchasers, and private industry as well—increased by about 60%, from 1684 to more than 2700. These prominent national agencies and numerous other standards organizations, private and governmental, are currently working on substantially enlarged programs compared with those of 1945.

Questions for company policy. This growth clearly reflects an increasing conviction on the part of management that national standards serve a useful function, for the standards of national agencies are developed by representatives of industry acting under instructions from the managements of their companies. Nevertheless, many executives question the significance of this trend. Does the growth of national standards mean that the administration of the company is to be increasingly dictated by decisions made outside the control of the firm? What policy should the company adopt regarding the use of national standards in its own operations? Should the company contribute funds and the time of personnel for the development of national standards applicable to its operations by agencies such as the technical societies and the American Standards Association? The analysis in the following pages is de-

signed to help provide answers to these questions.

The Role of Company Standards. So far as the company is concerned, national standards once adopted, are applied in the administrative process precisely as are standards developed entirely under the direction of the personnel of the company. It is useful, therefore, to summarize here the role played by company standards in industrial administration.

Standards Travel Under Different Names

The administrative process. The use of standards permeates the complex fabric of administration in any industrial company. A standard is a solution to a repetitive problem, selected by conscious decision and used as a model to be followed or to provide the basis for comparison. Many standards in ordinary business practice are not called "standards," but are described by terms such as policies, objectives, budgets, organization manuals, product designs, recipes, operating methods, programs, technical terms, and procedures. By whatever name they are called, when repetitive situations require action, standards play a part in each step of the administrative process by which the decisions are made and applied to operations. The steps and the part played in them by standards can be summarized as follows:

1. Decision making which involves, as the final step, crystallization of the solution in the form of an oral or written standard appropriate for communication;
2. The use of the standard as a model to be followed in directing operations;
3. The use of the standard as a model to be followed in training personnel;
4. The use of the standard as the basis for comparison in controlling operations;
5. The use of the standard as a part of the company's system of standards in coordinating operations;
6. Periodic repetition of the process to keep standards abreast of advances in the state of knowledge.

Functions. Standards, in the sense just described, provide the oral and written record of enduring administrative decisions of the company. They are related one with others into a system of standards; serve as models to guide future operations; and perform the basic function of coordinating and integrating the manifold detailed operations into a harmonious whole directed toward achieving the overall objective of the firm. In more detail, a well-constructed system of company standards in industrial administration serves:

1. To increase the precision and speed of the decision-making process by providing objectives which (a) limit the field of inquiry where alternative solutions are sought, and (b) furnish the criteria for measuring and comparing them.
2. To facilitate communication in all administrative processes by providing the specialized technical language needed to supplement the common language.
3. To facilitate, in directing and controlling, the communication of solutions selected by decisions and to preserve the solutions for future use, by crystallizing them in readily understandable form.
4. To conserve research effort and reduce the work-load of executives and subordinates by avoiding the expenditure of time and other resources in repeatedly solving recurring problems.
5. To increase the efficiency of performing repetitive operations by standardizing them and then reducing them to routine through the training and learning processes.
6. To coordinate operations so their contribution to the general objective of the organization is maximized by providing directions and controls with systematically related substantive and procedural content.

The Inter-organizational Nature Of Decision Making

Standards development and decision making. Because a standard is the crystallization of a decision, the standards development procedure is always a decision-making process. In practical usage, however, the term "standards development procedure" implies a deliberative process and is not used when referring to the subtle mental processes involved in making "hunch decisions" which also may result in standards. Standards based on hunch decisions are not directly relevant to the discussion in the following pages, however, because national standards result from inter-organizational decisions which are complex and involve deliberation and conscious weighing of alternatives.

Deliberate decisions involve at least the following steps, (1) recognition of the problem, (2) the development of alternative solutions, (3) a decision to adopt one solution, and (4) crystallization of the solution as a standard. So long as standards are developed by the company, these steps all appear to be under the control of management. But when a national standard is adopted, even voluntarily, the company seems to have surrendered control over at least part of the process to "outsiders", and when an external standard is forced on the company by customers, labor unions, or government agencies control seems to have been lost over all steps of the process. Whether adoption of the standard is voluntary or mandatory, the introduction of outside influences is often considered to be undesirable.

A More Illuminating Concept Needed For Understanding

Concepts of organization. These companion views that (1) company standards are under the control of the company, and (2) the influence of outsiders is an undesirable encroachment on the rights of management, are extreme views which, if taken literally, are really fictions. These fictions are vestigial remnants of "the public be damned" era of management thinking. They are consistent with the concept that a company organization is simply a system of relationships between its executives and employees where the chief executive holds the reins of the company in his firm grip and exercises complete control over all operations.

A more illuminating concept for purposes of understanding the basic significance of national standards, pictures an organization as the system of consciously coordinated activities or forces of *all* those who contribute action to accomplish a common purpose. By this concept, first developed by Chester I. Barnard, the organization of an industrial company consists of the system of *all* the consciously coordinated activities or forces of stockholders, officers, employees, customers, suppliers, and others who influence the accomplishment of the objective of the company.

The fact that suppliers and customers only sporadically perform such actions, while the officers and employees perform them forty or more hours each week, does not lessen the importance of the former as contributors. Obviously, no organization could survive without the action, even though sporadic, contributed by customers and suppliers.

Barnard points out that there are three necessary elements of an organization: (1) common purpose, (2) willingness to serve, and (3) communication. These together with (4) the restraints imposed on company decisions by competitors and government agencies, provide a useful framework for developing a picture of the inter-organizational nature of decision making.

Common purpose and the system of standards. There has been much discussion in the management literature of just what the common purpose, that is the general objective, of an industrial company should be. The tendency has been to attribute several objectives or purposes to an enterprise rather than the single one of making profits. The view is adopted here that all the purposes ascribed to rationally managed private industrial enterprises can be subsumed under one general objective: to maximize profits in the long run, if "the long run" is understood to introduce influences which modify the short-run profit motive to take into account other objectives such as to survive, to have satisfied customers, to have satisfied sources of supply, to have satisfied employees, and to be "a good citizen."

As this general purpose, profit maximization in the long run, is successively detailed by decisions at each level of the organization, the important solutions are crystallized in the form of written or oral standards. A system of standards is thus constructed which registers in definite form the hierarchy of detailed objectives for all the levels of the organization from the president's office down through the operating production departments and branch sales offices.

Standards Set Objectives and Define Incentives

At each level it is the job of the executive in charge to see that the objectives (standards) assigned to his department by higher authority are elaborated and assigned in the form of more detailed standards to guide the activities of the departments or personnel under him. In performing this function, he must deal with the system of relationships between the company and *all* the contributors of the organization whose actions fall within the scope of his responsibility. Probably a majority of these relationships are with contributors of the organization who are not full time employees of the company.

Standards as incentives. The company cannot achieve its purpose of maximizing profits in the long run unless the contributors of its organization are willing to serve, and they are willing to serve only if they are given incentives to do so. These incentives are defined in large part by the standards which describe the products, prices, wages, working conditions, work methods, and organizational relationships of the company. Each incentive is a *personal incentive*, external to the company, which serves to impel each contributor to act in ways which will help maximize the profits of the company. Many standards thus, serve the dual function of defining the immediate objectives of company operations and *also* the incentives of contributors. A set of drawings and specifications for a product, for example, define both an objective for production operations and the qualities of the product which induce customers to buy it.

It is one of the difficult jobs of management to devise a decision-making procedure which insures that standards serve both functions. This task is difficult because there are typically short-run conflicts between the objectives of the company and those of contributors.

When the current profit desire of the company leads it to offer incentives insufficient to induce contributors to act, then the company must either modify its profit objective by offering greater incentives or modify the desires of its contributors so that the incentives it is offering are sufficient to induce them to act. Companies work to modify the desires of their contributors by appeals to the emotions and by appeals to facts. After appeals to the emotions have had their effect, however, some substantial hard core of fact remains to be dealt with, and this provides the substance of each standard. Wage standards, for example, are expressed in dollars and hours of work, which mean costs and productivity to the company and income and effort to the workers; commodity standards are expressed in dollars and product utility which mean costs to the company and satisfactions in service to the user. When company objectives and contributors' objectives are in conflict, standards development procedures work to modify them and bring them into agreement by appeals to facts rather than emotions.

Uncontrollable Factors Influence Standards

A little thought on the changes brought about in personnel, product, and purchasing standards because incentives must be provided for employees, customers, and suppliers to become effective contributors of the company, will reveal the complex inter-organizational nature of decisions on company standards. Any effective standards development procedure must take into account not only the company's immediate objectives, but also the personal incentives of contributors which introduce factors outside the direct control of management.

Restraints imposed by government and competitors. Relationships with government agencies and competitors, like those with contributors, impose important restraints on the pattern of alternatives from which management is free to select company standards.

Government agencies, charged with protecting the public interest, establish laws and regulations which impose limits above which, or within which, the values included in company standards must be set. Examples, of course, are numerous. They include federal and state laws governing taxes, interstate commerce, communications, minimum

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wages, maximum hours, safety regulations, air and water pollution ordinances, building and electrical codes, traffic regulations, food and drug regulations, and federal, state and local regulations governing packaging, labelling, weights and measures, and claims made in advertising. The interests of the public as expressed through such regulations impose restraints on important administrative decisions in every company. They are respected, if for no other reason, because the right to engage in private business for profit is basically contingent upon public approval.

The restraints placed by the action of competitors on the standards defining the qualities and prices of the company's products, and also on those defining the character and costs of all the factors of production, need no elaboration. They are strong external factors exerting influences on company standards which must be taken into account if the company is to survive the competitive struggle.

Users Should Share In Developing Standards

Standards development procedures, then must not only insure that standards define the objectives of the company and provide incentives for contributors, but must also insure that standards are set within the limits permitted by the restraints imposed by government agencies and competitors. Ideally, these inter-organizational standards which the company shares in common with government agencies and competitors should be developed by procedures which give all three parties a voice in their establishment.

Communication. In addition to central purpose and willingness to contribute, which have been discussed, the third essential element of organization is communication. Its essentiality in the simplest form is obvious: no organization can function unless its management, employees, and everyone connected with it can exchange ideas. Less obvious is the fact that the necessity for effective communication introduces strong outside influences into the decision-making process.

The standards used in communication are important because (1) for every company a specialized technical language is a necessary supplement to the common language if ideas are to be communicated efficiently, (2) inter-organizational communication is essential if the company is to tap the reservoirs of the common fund of knowledge, and (3) although they are developed as simple definitions of terms to facilitate communication, at times they force costly changes in product designs or other company standards.

Progress Based On Topping Common Fund Of Knowledge

The communication of ideas is accomplished by words and symbols, all of which are standards. In addition to the common dictionary language, every company relies on specialized terminologies which are needed to describe the activities special to its industry and to the sciences and professions which compose its technology. Conscious inter-firm decisions are frequently needed to supplement the informal processes by which language ordinarily becomes standardized if technical terms are to be used with the same meanings by the firm's personnel, suppliers, customers, government agencies, competitors, and research workers in the same or allied fields.

No company can rely solely on its own resources to develop its technology. Its chances of keeping abreast of competition are determined in significant part by the ability of its personnel to tap the fund of knowledge which is potentially available to all. This ability to tap the common fund of knowledge is strongly influenced by the efficiency of communication which in turn depends on the existence of national and international standards: terms, symbols, weights and measures, methods of test, drafting room practice, methods of presenting data, and the like. Moreover a significant part of the body of knowledge, as well as the means of communicating it, is crystallized in the form of national or international standards such as materials characteristics, factors of safety, standard constants, formulae, design elements, and all kinds of methods and procedures. If this knowledge both in the literature generally and in the form of standards, is to be readily accessible to the research workers and executives of a company, the terminology they use—a segment of the system of company standards—must be common with the terminology of the science, profession, or industry from which the knowledge emerges and in which, therefore, it is recorded.

Most companies accept the existence of workable technical terminologies almost without consciousness of the decision-making processes by which they came into being. On occasion, however, profits are seriously threatened by an external standard defining a term, and then the company becomes sharply aware of the need to participate in the decision. For example, if the cane growers propose that the word "sugar" be defined to include only sugar made from cane, the sugar-beet growers will want a voice in the decision-making process.

Terminology is basic to all company standards and in various ways the influence of "outsiders" affects the administrative decisions which superficially seem to be the responsibility of company executives.

Importance for organization. The foregoing analysis leads to two conclusions which are important for the discussion of organizational devices.

First, all decisions of the firm are in some degree influenced by outsiders and the content of company standards is never completely within the administrative control of the executives of the company. In degrees differing for different classes of standards, decisions are composite ones in which many people participate, executives and contributors of the company, government agencies, competitors, and all those who add to and draw from the common fund of knowledge essential for the company's successful operation.

Managerial Control Varies With Circumstances

The degree of control management has over company standards varies from none to almost complete control. Occasionally when standards are developed by government agencies without consultation with the company and are imposed on it by law, the company has no practical alternative to adopting the external standard. Economic pressures, however, may withdraw the power of decision from the company as certainly as legal regulations. For example, a company manufacturing electrical equipment for general sale can refuse to incorporate the "voluntary" standards of the National Board of Fire Underwriters into its system of company standards only if it wishes to commit corporate suicide. And, a company is in a similar situation when it is offered

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a large order for a special product made to a customer's standards. More frequently the company has a strong, but by no means dominant, influence, as in the determination of designs for the standard products in its line, or the development of its purchase specifications for production materials. In other situations it has the dominant influence, as in the selection of its standard methods for detailed clerical and production operations.

Secondly, company standards are seldom unique, but are identical, sometimes in *all* but more frequently in *some* characteristics, with the standards of other organizations. Technical terms must be used with identical meanings by everyone to be most effective. A standard method of inspection used by a company, to serve its purpose must be identical in all characteristics with that used by its customers or suppliers. For some industrial goods, product designs and customers' specifications are substantially identical; for many goods, only certain important characteristics are identical in the design standards of suppliers and the purchase specifications of customers, while other characteristics are different. And many company standards, such as those which define highly styled consumer goods or production operations devised specially by the company, may be completely or substantially unique. The common use of standards may extend only to two organizations or to all similar organizations in the country. For example, a design standard for a special product may be identical only for the supplier and his customer, but because the company's customers may deal with most or all of its competitors, a part of the product design standards of the company, its customers, and its competitors become identical within workable tolerances. Screw-thread standards, in contract, are identical for most companies in the nation.

The concept of a national system of standards. The concept of organization which has been used in the foregoing pages focusses attention on the interrelated nature of all organizations in the economic system. Each organization consists of a system of relationships with its contributors, and a company's relationships with each contributor is a part of that contributor's organization. All organizations in the economy are connected by these common relationships and the company is thus articulated into a national economic system.

National Standards Result From Common Elements

Paralleling the concept of a national economic system is the concept of a system of national standards. The relationships which companies have in common are frequently defined by common standards. These common standards are themselves related by common terminology, common units of measurement, common methods of test, and often by common end uses, or by the fact that two standards define products one of which is the raw material for the other. These common elements articulate such standards into a national system.

In practice, of course, no one mind can comprehend the system of national standards in all its detail, and no one organization includes in the scope of its operations the whole system. Many of the skeletal features, however, are apparent. Dictionaries of the English language supplemented by glossaries of technical terms provide the national system of terminology for communication of ideas. Intertwined with these and extending from them are the many basic standards such as those for weights and measures, reference temperature, standard constants, methods of test, machine elements such as screw threads, and important commodity standards. Organizations are always working on the marginal problems which give them the most trouble, and from this decision-making process common standards emerge which become parts of the national system. The relationship between each standard and the closely related adjacent ones is always apparent, although the whole system can never be clearly visualized.

Each system of company standards is articulated into the system of national standards by the standards which are common to both. Company standards are thus an extension in detail and in breadth of coverage of the system of national standards. (End of Part I)

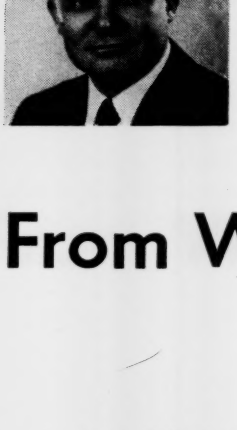
Part II of this article will appear in the December issue of ADVANCED MANAGEMENT.

NOVEMBER CHAPTER ACTIVITIES

CHAPTER	SUBJECT	SPEAKER	TITLE	PLACE	DATE
Alabama	What Makes a Successful Executive	James King	V. P., American Associated Consultants	Tutwiler Hotel	9
Baltimore	Selecting and Training Industrial Engineers	Nicholas A. Martucci	Mgt. Consultant, National Industrial Conference Bd.	Stafford Hotel	3
	Plant Visitation			Chesapeake & Potomac Telephone Co., York Road	10
	Roundtable—Designing for Economy			Bendix Radio Div., Bendix Aviation Corp.	17
Binghamton	Controls Can Be Dynamic	William Travers Jerome III	Dir. of Executive Controls, Syracuse University	Hotel Arlington	10
Bridgeport	Management's Problems in the Development and Use of the Helicopter	Capt. John Vest	Exec. Asst. to Chief Engr., United Aircraft Corp.		2
	Technical Discussion—Leveling	Phil Carroll	Management Consultant		16
Central New York	Annual Two-Day Conference — "Executive Development" and "Why People Work"			Syracuse, N. Y.	11 & 12
Chicago	Tools of Operations Research —Linear Programming			Rm. 1267, 1st Nat. Bank Bldg., 38 So. Dearborn	2
	Selling Methods Improvement	D. G. Moore	Ind. Relations Center, U. of Chicago	Furniture Club of America, 666 Lake Shore Drive	9
		S. L. Fecht	Pres., S. J. Fecht & Associates		
		B. E. Hoover	Mgr., Div. of I. E. Armour & Co.		
	The Union Contract and Cost Control	Owen Fairweather	Seyfarth, Shaw, & Fairweather	Furniture Club of American Furniture Mart	23
Cincinnati	Planning and Control—The Manager's Everyday Job	Alex W. Rathe	Asso. Prof., Mgt. Engr., New York University	Hotel Alms, Marie Antoinette Room	4
Clearing	Harvard Case Study Group	J. M. Duffy, Chairman		Clearing Industrial Club	4
	Controllers & Cost Accountants	E. A. Gustafson, Chairman		Clearing Industrial Club	16
	Operations Research Forum	R. C. Lindberg, Chairman		Bedford Park Community Center	17
	Harvard Case Study Group	J. M. Duffy, Chairman		Clearing Industrial Club	18
Cleveland	Materials Handling In Your Plant	The Materials Handling Institute's Traveling Clinic & E. McCaul	J. Webb Company	Hotel Allerton	1
Columbus	Motivation			Hotel Ft. Hayes	18
Dallas	Organizing for Cost Reduction	Bruce Payne	Bruce Payne & Assoc.	Melrose Hotel	17
Dayton	Decentralization of Functions in a Manufacturing Organization	I. J. Green, Chairman			23
Fox Valley	Effect of Product Design on Sales Appeal	Richard Latham	Raymond Lowey Assoc.		10
Georgia	Workshop Seminar—Wholesale Packaging—Intransit Protection	Dr. R. T. Staton	Prof. Ind. Engr., Ga. Inst. of Tech.	Wilby Room, Price Gilbert Library, Ga. Inst. of Tech.	4
	Practical Inventory—Control Procedures	Todd G. Cole	Controller, Delta-C & S Airlines	Georgian Terrace Hotel	18
	Workshop Seminar—Records and Record Keeping	George Morris	Management Consultant	Wilby Room, Price Gilbert Library, Ga. Inst. of Tech.	23
Greensboro	Harvard Case Studies				2
	Harvard Case Studies				9
	Electronics Applications	John Parker	Remington Rand		16
	Harvard Case Studies				23
	Harvard Case Studies				30

NOVEMBER CHAPTER ACTIVITIES

CHAPTER	SUBJECT	SPEAKER	TITLE	PLACE	DATE
Greenville	Incentive Management	L. J. Dunn	Veeder-Root Inc.	Hotel Greenville	10
Hudson Valley	Nonfinancial Incentives	Robert Wolfe	Consultant	Hendrick Hudson Hotel, Troy, New York	9
	Cost Reduction Through Traffic Management	Arthur D. Brown, Chairman Bruce Riggs, Panel	Behr-Manning Corp. Behr-Manning Corp.	Behr-Manning Corp., Watervliet, N. Y.	11
Indianapolis	The Scope and Potentialities of Automation	Gilbert Murie	Ford Motor Co.	Hotel Marott	11
Kansas City	All Day Annual Industrial Engineering Conference			Hotel Muehlebach	19
Knoxville	Effective Organizational Communications	Paul Good	Mgr. Dept. of Education, U. S. Chamber of Commerce	Chamber of Commerce	16
Lancaster	Top Management Looks at the Organization	Paul D. Arnold	Pres., Arnold Bakeries, Inc.	Hotel Brunswick	16
Lehigh Valley	Industrial Operations Research	Prof. Clarence E. Bullinger	Head-Ind. Engr. Dept., Penn. State U.	Howard Johnson's	9
Madison	Roll Playing-Selling the Boss	Dr. William J. Pinard			3
Milwaukee	Economic Crisis, Fact or Fiction	R. Laws	Director of Economics, S.A.M.	E. S. M. Building	11
Montreal	Labor and Management Debate Fringe Benefits	L. Hemsworth J. Marchand Prof. H. D. Woods		Ritz-Carlton Hotel	10
Nashville	Effective Methods of Training			Andrew Jackson Hotel	11
New Haven	Guaranteed Annual Wages (Ind. Rel. Round Table)	John Marchiando, Chairman	Ind. Relations Mgr., Armstrong Rubber Co.	Chamber of Commerce	10
	Corporate Structure and Finance	Patrick B. McGinnis	President, New York New Haven and Hartford Railroad	South Meriden House, Meriden, Conn.	18
New Orleans	Topic to be Selected	Bruce Payne	Bruce Payne & Assoc.	Roosevelt Hotel	16
Northeastern Pa.	Current Material Handling Problems	R. Kennedy Hanson	Mgr. Dir., The Material Handling Institute		1
Northern New Jersey	Methods of Locating Profit Leaks	E. J. McCormick	Consulting Engineer, McCormick & Co.	Essex House, Newark, N. J.	18
Philadelphia	Management and Marketing in the Direct Selling Field	H. L. Lieberman	Fuller Brush Co.	Poor Richard Club, 1319 Locust St.	10
	Linear Programming	Harry A. Rotondi, Chairman		Atlantic Refining Co., 260 S. Broad St.	16
	Service & Field Replacement Policies & Practice	Harry A. Rotondi, Chairman		Atlantic Refining Co., 260 S. Broad St.	30
Pittsburgh	Measuring Management's Performance			Gateway Plaza	18
Portland	Student Chapter Night	Bill Engessor, Chairman		Pacific Power & Light Bd. Rm., Public Service Bldg.	17
Providence	Job Evaluation	Cecil Bloomer		Providence Engineering Society	4
Raritan Valley	A Future in Modern Management	Dr. F. F. Bradshaw	Pres., Richardson, Bellows, Henry & Co.	Roger Smith Hotel, New Brunswick, N. J.	17
Reading	A New Development in Management—Employee Communications	H. H. Carey	Management Consultant	Iris Club, Wyomissing	8
Richmond	The Role of Foreman in Industrial and Public Relations	W. A. Egerton	Dir., Ind. Rel., American Enka Corp.	John Marshall Hotel	30
Trenton	Major Causes of Success and Failure of Work Simplification Programs	Joseph R. Ryan	Atlantic Refining Co.	Hotel Hildebrecht	23
Twin City	Executive Development—What Is It	Dale Yoder Tom Mahoney		Coffman Memorial Union, U. of Minn.	11
Wilmington	Communication	William Exton	Management Consultant		9
Worcester	Making Industrial Engineering Effective	R. Conrad Cooper	V. P., U. S. Steel Corporation	Putnam & Thurston's	15



Dr. C. A. Slocum

With this issue we begin a more extensive reporting of Chapter news. In such limited space it will still be impossible to cover all of our Chapters' wide and varied activities. But we shall try to cover at least the most outstanding events—those projects which we feel will be of the greatest general interest to our members.

From Where It Counts . . .The Chapters

AT THE 40th Annual SAM Management Conference, held October 28th and 29th at the Hotel Statler in New York City, Chapter Performance Awards were presented to the chapter and individual winners for the 1953-54 period.

The Harrington Emerson Bronze Tablet and Citation went to the Worcester Chapter for the best chapter performance during the year, determined by the total number of points earned.

The Kansas City Chapter won the Ordway Tead Bell and Gavel and Citation for points giving them second place in the Performance Awards contest.

The President's Award went to the Clearing Chapter for making the greatest percentage improvement in chapter standing during the Plan Award year, going from 56th place in 1952-53 to 6th place in the 1953-54 period.

Chapter Performance Banners were awarded to the chapters which were the first ten among all the chapters as determined by the total points earned under the Chapter Performance Awards plan. They were as follows, in the order of their winning rank:

Worcester
Kansas City
Lancaster
Western North Carolina
Trenton
Clearing
Raritan Valley
New Haven
Pittsburgh
Nashville

(The Chapter Performance Banners are 6'3" in size, have a blue background with golden yellow lettering indicating the chapter's name, place, and the SAM seal.)

SPECIAL AWARDS

Special Awards were given for the many commendable activities of those aggressive chapters and individuals whose outstanding efforts cannot be measured by the factual Chapter Performance Awards Plans' point system.

Professional Publications: From the many articles submitted by SAM chapter members the winners for this special award were chosen from those which advanced the science of management as defined in the statement of the purposes of the Society For Advancement of Management. The manuscripts submitted for this award were based on all phases of management as defined by the SAM code. Special Awards for the best articles went to the following members:

A special scroll to Meyer M. Semel, of the Northern New Jersey Chapter, Industrial Relations Surveys, 1004A Springfield Avenue, Irvington, N. J., for his article which appeared in the September 1953 issue of ADVANCED MANAGEMENT, entitled "Management-Union Future: Collective Bargaining and Voluntary Arbitration or Government Control".

A special scroll to Charles E. Heitman, Assistant General Manager, The A. O. Smith Corporation, Milwaukee 1, Wisconsin. Mr. Heitman, a member of the Fox Valley Chapter, received a publication award for his article entitled "Using Standards As Controls In Factory Management", which was published in the July 1954 issue of ADVANCED MANAGEMENT.

Quality of Program Announcements: To give recognition for high quality in composition and printing of materials used by the Chapters in advertising their activities, a special award was given for Quality of Program Announcements. The material selected for the winners of this award were judged on the following factors: 1. Quality of Printing; 2. Effectiveness as a Publicity Media. All printed publications or announcements pertaining to the Chapter's activities for the year were given consideration.

For monthly meeting announcements the awards went to:

Trenton—1st place
Kansas City—2nd place

The annual Calendar of Events award went to New Haven.

Awards for the most effective Newsletters went to:

Montreal—1st place
Kansas City—2nd place

Conference Publicity award went to Kansas City for first place. There were no second or third place winners in this category.

The award for Special Meeting Announcements went to Montreal.

Research Project Award: No submissions.

Civic Service: In recognition of the fact that management leadership must be community leadership, the purpose of this special award is to recognize such worthwhile activities among the

ANNOUNCEMENT

As we were about to go to press with this issue it was regretfully announced by Mr. George B. Estes, National President of SAM, that Dr. C. A. Slocum has resigned as Executive Director of the Society, due to ill health.

Dr. Slocum's resignation became effective as of November 1, 1954.

chapters which benefit not only members of the Society but their communities also. The projects are judged individually on the following factors: 1. Contribution to the community; 2. Number of chapter members participating in the project; 3. Originality; 4. Completeness of the projects. Special Scrolls were presented to the Philadelphia, Milwaukee and Kansas City Chapters for their Civic Service projects completed during the 1953-54 period.

Philadelphia submitted a Work Simplification Project for City Supervisors. (A copy of this report is printed elsewhere in this issue of ADVANCED MANAGEMENT. Milwaukee presented their "You Be The Boss" contest. Kansas City submitted: 1. Donation of Technical Books to the University of Kansas City Library and Linda Hall Library; 2. Kansas City Management Conference sponsored jointly by the University of Kansas City, School of Business and Public Administration and the Kansas City Chapter of SAM, and 3. Participation in Career Day at Central High School, Kansas City.

Student Chapter Promotion: In this Special Award category there are three groups in which chapters may participate for the award. 1. Starting a new Student Chapter; 2. Sponsoring Student Chapter membership growth; 3. Contributing to the quality of the program to meet the student's need for management knowledge and understanding, and stimulating the students to become proficient in the art and science of management.

The Student Chapter Promotion Special Scroll award went to the Kansas City Chapter for starting and promoting the University of Missouri Student Chapter. END

Our New Editor

Dale E. Zand

Professor of Management, New York University

The Society is honored to have Dr. Zand in its Publications Editor's chair. With his wide knowledge and understanding of management problems, our members can feel secure in the knowledge that ADVANCED MANAGEMENT will extend still further its already wide coverage of new advances in the management and distribution areas.

In addition to teaching management, Dr. Zand has also had extensive experience as a practicing management man. He has acted as consultant to the Pennsylvania Railroad, to the Book Publishing Industry, and to the U. S. Navy. He was vice president of the Glo-Cold Company, plant manager for Spectator Bag Inc., and systems planning engineer for the Potomac Electric Power Company.

C. A. SLOCUM

New Products . . .

A **Meter-Indicating Level Monitor** which derives its signal from an inert capacitive sensing probe, is a new product of Thermo Instruments Company. The instrument can be operated from high vacuum to pressures as high as 100,000 psi.

A multiple rotary card file, **Roto-File,** enables a clerk to find any one of 80,000 or more record cards in seconds and can be worked by as many as three clerks simultaneously. A product of Mosler Safe Company, the new file is designed to eliminate bottlenecks and waste motion in the handling of active records.

A **Climate Changer** that heats or cools air and is also equipped to humidify and dehumidify as well as filter dust and dirt from the air is a sensational new product introduced by The Trane Company. The machine contains any combination of six phases of air conditioning.

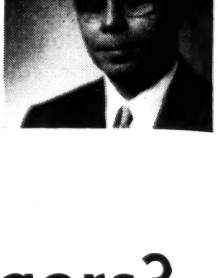
A new **All-Purpose Truck** consisting of Platform, Bin, Table, Shelf and Box Trucks which will fill the need of Medium Duty Handling Equipment in any type establishment is being produced by Wilder Manufacturing Company, Inc.

Beltone Hearing Aid Company has developed a **Hearing Test Instrument** with 75% less component parts than most audiometers now in use. It weighs less than 11 pounds, can test individuals or groups up to 40 persons.

A **Portable Steam Cleaner** that will effectively clean the toughest dirt in railroad box cars, chemical processing plants and areas contaminated by flood waters is a new development of Vapor Heating Corporation. The unit develops 120 pounds working steam pressure in two minutes from cold water, and over 1100 pounds of steam per hour which is directed through a Sellers Injector where the steam heats the water and the pressure is increased by a venturi in the injector. The unit is mounted on a two-wheel trailer, enclosed in a metal cabinet. Fuel tanks for eight hours of operation and a float control water supply tank are included in the cabinet. High pressure steam hoses and a cleaning gun are also a part of the equipment.

A **Heavy Duty Snow Thrower** for faster handling of big snow removal jobs around factories, institutions, commercial firms, etc., has been put on the market by Jari Products, Inc. Powered by a 2½ hp gasoline engine, the plow operates on the same principle as giant rotary plows used on railroads and highways, which throw rather than blow the snow. It has a special rotating "raker bar" that chews up packed snow plus a wide-open front end that won't clog in slushy snow. END

Bruce Payne
President, Bruce Payne & Associates, Inc.
SAM Director-at-Large



Where Are Our Future Top Managers?

Mr. Payne reports on the new SAM-sponsored program for younger business executives, outlining the requirements for competition for the Bruce Payne Fellowship, by which a young member of SAM may spend two years at the Harvard Business School, taking part in the Middle Management Program

SAM members, we believe, are the top managers of the future. Through our Chapter programs SAM members are developing their talents and abilities in management, for management training and development is the major objective of our Society. The combination of our Chapters' programs and our National Organization programs should make it possible for SAM members to reach top goals in management. No other management Society has the Chapter organization SAM has, therefore we are the only Society that can give its membership proper continuity in a management development program—a continuous voyage to the top!

The second session of the new SAM-sponsored program for younger business executives starts on January 31, 1955. Through sponsorship of this Middle Management Program SAM again asserts leadership as the management Society intensely devoted to management development. Because this objective is of prime importance to our chapters, it is a vital part of the National Organization's program and should be a vital element in Chapters' program and planning also.

The Middle Management program at the Harvard Business School is designed for men who are already launched on careers in business. Its aim is to prepare these men for increasing responsibility. The course leads to the degree of Masters in Business Administration.

The need for a rigorous and intensive course in business administration for younger executives applies equally to all kinds of businesses, both small and large.

Participants in the Harvard Business School program must be sponsored by their companies. Generally, they have had one or two positions involving important responsibility, have demonstrated ability on the job and potential for increasing responsibility.

The Program is designed to reach young executives at the most opportune time for taking advantage of their maturity and experience and for developing their abilities to the fullest. They must be old enough to know something about business, young enough so that the benefits they derive from the course will serve their company through a long future executive life. They should be ambitious and keenly interested, and willing and able to work hard.

Aside from experience and company sponsorship there are no fixed prerequisites for participation in this program. Company sponsorship is important since the program is designed to fit into a company's overall plans for executive development. Candidates should be between the ages of 28 and 35, and they should have 5 to 10 years of business experience. An undergraduate degree is considered desirable, but is not imperative.

Sponsorship must and should include financial assistance from the company. The amount of the assistance or the exact details of the arrangements between the participant and his company sponsor are not of concern to the Harvard Business School.

The Bruce Payne Fellowship has been created by the Board of Directors of SAM to make it possible for one Society member to attend this Middle Management Program at the Harvard Business School for each of the next three sessions, by providing his $2,000 tuition. The Fellowship is supported by the Bruce Payne Educational Foundation.

It is the hope of the Directors of SAM that each Chapter will make a nomination for this Fellowship so that the most promising management man from the membership will be selected. With success, this Fellowship will be extended beyond the initial three year period and other graduate schools could come under the Fellowship as well.

Each Chapter has the privilege of nominating one of its members for this program. *The closing date for nominations is November 30th*, since the Fellowship Committee must make its recommendations to the Harvard Business School by December 5th.

Procedure: The Chapter is to have its nominee complete the application and medical questionnaire and submit it to the Fellowship Committee by November 30, 1954. Supporting data,

including the nominee's contribution to the Chapter, is to be included. Address all correspondence to the Committee, c/o the Society for Advancement of Management, 74 Fifth Avenue, New York City.

The company sponsorship form must also be completed by a company executive and submitted to the Committee.

The application fee will be paid by the Foundation.

All Chapters will be notified as soon as the Harvard Business School makes its final selection from the presentation of your Fellowship Committee.

Should you need more information your Fellowship Committee stands ready to serve you as well as the administration at the Harvard Business School.

The Program: The experiences of the Harvard Business School in the field of management education point to a high degree of effectiveness for an educational program aimed at the middle management level. Through the case method of instruction each man can build on his past experiences and on the experiences of others in the program. He will be working closely with men from other fields, other companies, other industries, various departments of the government, and from abroad.

He will participate in the analysis and solution of a great many different current business problems. He will become familiar with and have to deal with a wide variety of managerial problems.

In short, each participant will acquire a broad experience which extends far beyond anything he could acquire within a single company or even within an industry. This new program should appeal particularly to men whose training and experience have been in more or less specialized areas such as engineering, science, and law, as well as those whose formal education has been in the liberal arts.

The Curriculum

The course extends over a period of sixteen months, beginning at the end of January each year. During this time it covers the equivalent of what is normally covered in the two-year Harvard M.B.A. course. This is made possible by eliminating vacations, by intensifying some of the academic work, and by taking full advantage of the maturity and experience of the group.

CHAPTER STANDINGS

October 1, 1954

New York	410	Reading	63
No. New Jersey	382	Wilmington	63
Philadelphia	320	Hartford	62
Cincinnati	306	Bridgeport	61
Chicago	282	Columbus	61
Cleveland	274	Lehigh Valley	60
Pittsburgh	249	Providence	60
Lancaster	224	Charlotte	59
Detroit	211	Central Penn.	58
Boston	208	Alabama	54
Washington	202	Knoxville	54
Milwaukee	154	St. Louis	54
Los Angeles	149	Clearing	51
San Francisco	146	Western Mass.	49
Worcester	142	Calumet	47
Dallas	128	Central N. Y.	45
Western N. C.	111	Greenville	44
Raritan Valley	110	Sacramento	44
Kansas City	102	Manchester	39
Indianapolis	101	New Orleans	39
New Haven	100	Twin City	39
Hudson Valley	99	Fox Valley	38
Baltimore	95	Madison	34
Montreal	91	Louisville	33
Binghamton	88	Nashville	31
Greensboro	87	Portland	31
Dayton	84	Northeast. Penn.	28
Georgia	72	Stamford	20
Richmond	70	Non-Chapter	102
Trenton	68	Non-Resident	83

February to August: The first half of the program will consist of a prescribed group of courses covering the fundamental areas of administration. In addition to the major functions of production, marketing, finance, and control the importance of human relationships in administration is emphasized. In each of the courses the men learn to discover, analyze and weigh the factors bearing upon an issue, to reach a practicable solution, and to devise suitable means for putting that solution into effect. They also expand their knowledge of the general framework of business relationships, and of the administrator's responsibilities in the social, economic, and political system in which business operates. During this period they are also expected to develop skill in written and oral communication, especially in presenting case analyses and in presenting recommended courses of action.

September to May: For the second half of the program the group joins in the advanced M.B.A. courses. Here the men are required to deal with increasingly complex problems. They make field trips in connection with their course work. They become familiar with the point of view of the chief executive and the directors responsible for overall company operations.

A wide choice of courses is available in this second half of the program. These vary from those which deal directly with the functional aspects of business, such as Manufacturing, Advertising, Personnel Administration and Procurement, to courses designed to give the men broader perspective, such as Business History, Business Conditions and Human Relations.

In addition, this period provides opportunity for men to pursue special interests. Although the curriculum does not encourage over-specialization, it is possible to achieve a considerable concentration of courses in a major area, such as Accounting, Finance, Marketing or Production.

The Middle Management men continue together as a unit in the course called Business Policy. Building up and integrating the other work of the School, the course covers the fields of policy making and administration.

Case Method—Discussion Groups

During sixteen months at the Business School each man is put in the position of a business executive approximately 1,000 times; that is, he is presented with a total of 1,000 case problems. There are few lectures and almost no textbooks, though frequent reference is made to collateral reading and research.

The Cases: In a very real sense the men at the Harvard Business School actually "live" business rather than merely study it. The cases are descriptions of actual business situations secured from going business concerns. They are normal day-to-day operating problems in which someone had to make a decision or take some kind of action. The men are provided, in so far as is practical, with the same information that was available to the executive who had to make the original decision. From this point forward they are on their own to work out the problems and to present their solutions.

Discussion Groups: The cases are first discussed in small organized groups. One discussion group, for example, consists of a plant manager from Westinghouse, an engineer from R.C.A., a district sales manager from Scott Paper, an ex-Army legal officer, the parts manager of a small auto body company, and a future manager of a family business. This and other groups like it bring their solutions into the

classroom where further discussion is led by the instructor. From time to time the men submit in writing their individual recommendations for meeting a specific case problem.

Administrative Skills: This experience repeated over and over again develops a number of important administrative skills. It develops the power to analyze and to distinguish what are the important factors. It develops the ability to define problems. It develops the imaginative ability required to think in terms of solutions and alternatives. It develops judgment and facility for making decisions. It develops the responsible attitude necessary for thinking through the probable consequences of various courses of action. It develops skills of oral and of written communication. And finally, it develops the breadth, tolerance, and human understanding required in group discussions working toward the solution of a common problem.

General Objectives: The case method is based on the belief that it is more important to train men in the techniques of approaching and handling situations rather than to provide *general answers* in the hope that they will apply to all situations. Case problems are used to give the men experience in dealing with new administrative problems. This development of an effective *approach* for attacking administrative problems is the major aim of the case method.

Two Additional Important Aims

There are, however, two additional important aims. One is the building up of a fund of knowledge about business and about business techniques. Through reading about and observing many actual business situations the men become familiar with such tools as the income statement and balance sheet and standard costs. They learn about marketing techniques and sales media. They learn how businesses are organized and they learn the functions and responsibilities of the various executives. In short, they learn the language and framework of business. The other aim of the case method is to encourage each student to develop for himself some useful generalizations. These generalizations will be based on his own experience with business cases and, therefore, they will be particularly useful to him.

END

AIDS FOR THE BUSY EXECUTIVE

for General Managers . . .

1. **Management Faces New Problems.** Articles covering nearly every phase of present management function culled from papers presented at the 1953 SAM Management Conference by distinguished business leaders.
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2. **The Organizational Position of the Industrial Safety Engineer.** An exclusive study of why, where and when safety engineers are needed, and how to pick them. Illustrated with charts.
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5. **Time and Motion Study In Collective Agreements** by George J. Anyon, Ph.D. An analysis of factors from 1946 to the present relating to management and union positions on Time and Motion Study as it affects collective bargaining.
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for all Businessmen . . .

6. **Reprints of outstanding articles from** ADVANCED MANAGEMENT.
(a) *Can Executives Be Taught To Think?*—B. H. Jarman
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(c) *What Makes Successful Executives?*—B. B. Gardner
(d) *Being Important Together*—C. A. Wimpfheimer
(e) *Executive Development Through Colleges*— Planty, Beach, Van Ark
(f) *How To Chair A Conference*—T. H. Nelson
(g) *Our Living Standards Can Go Up*—P. D. Foote
(h) *Personalities in Labor-Management Conflicts*— A. A. Imberman
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(j) *Test Analysis of Time Study Men*—C. A. Thomas
each $.25

Please send me the selections I have circled below:

1 2 3 4 5(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)

I am enclosing a check for .....

Name ..... Member SAM? .....

Address .....

make all checks payable to

The Society for Advancement of Management, 74 Fifth Ave., New York City

Reward: $1,000 Per Hour

The Philadelphia SAM Chapter began its Work Simplification Program for that city government's first-line supervisors in September 1953. This is a report by Ervin Seltzer, Manager of Manufacturing Services, Stokes Molded Products, on the first year's progress, outlining the remarkable and rewarding results enjoyed by the project's participants —and the savings already in progress for Philadelphia's taxpayers

THE City of Philadelphia has about 25,000 employees and perhaps 1700 first-line supervisors. It was assumed that many of these supervisors would like to increase the productivity of their departments — if they but knew how; if they had the tools for methods improvement which the supervisor in industry usually finds available.

Of course, many City supervisors and employees independently achieve important advances in their operations, but largely on a hit or miss basis, and frequently depending on conditions in the middle and upper organizational levels of the local government.

The Philadelphia SAM Chapter Work Simplification Group had the idea of tackling the *bottom level of supervisors*, those who are largely concerned only with the day-to-day performance of their departmental tasks. This bottom level was to be stimulated to work mainly on immediate problems within their own jurisdiction, and, for good measure, problems requiring little or no capital investment for achieving cost reduction.

City officials enthusiastically cooperated in the program suggested by SAM members. Mayor Joseph Clark, Jr., blessed the project and passed it to his Managing Director, Robert K. Sawyer for action. Mr. Sawyer lent his own office, after hours, to be used as one of the classrooms. Initial organization was handled by Deputy Managing Director, Mrs. Tina Weintraub. She, in turn delegated enrollment, scheduling, methods auditing, and general coaching and counciling to her Chief Administrative Analyst, Mr. John E. Francis. The project moved quickly, easily and non-politically.

The Training Course

Much of the success of this program is attributed to the kind of training course which was presented. The details were carefully worked out with the Managing Director's Staff. The course was kept brief—seven, 2-hour sessions. And it was taken on a voluntary basis, after-hours.

The class group is limited to twelve, and each session slanted towards laboratory work; lecturing and sermonizing kept to a minimum. Every effort is made to get all supervisors at each meeting to question and discuss points raised. The topics covered are:

1st Meeting: Economics of Cost Savings. Motion economy — demonstration of the "peg board" problem.

2nd Meeting: The flow process chart — demonstration of a typical office problem with obvious "boners" hidden in it.

3rd Meeting: The Flow Process Chart —Class analysis of a problem brought in by a supervisor.

4th Meeting: The Man-Machine Chart — Classroom analysis of a problem brought in by a supervisor.

5th Meeting: How to analyze the work distribution of a Department — Class room exercise.

6th Meeting: How to analyze the amount of work done by a department. Class room analysis of actual departments represented.

7th Meeting: Review. This meeting devoted to review of the course and evaluating the dollar value of methods improvements actually installed or pending as a result of the course.

Each class session starts with a fifteen minute quiz on the content of the previous session. (For those readers interested, a copy of the written Class Notes, Quizzes, and Instructions to Seminar Leaders are available.)

Organization

Soon after the start of the program it was realized that one of the big problems would be to supply sufficient qualified seminar leaders because of the large number of supervisors who wished to take the course. It was decided that any practicing Industrial Engineer with fairly wide experience in working with supervisors on methods improvement would be qualified.

Interested men are asked to sit in on one or two sessions as an observer. They are then asked to discuss the course in detail. This briefing occupies three or four hours, spread over one or two evenings.

The leader is then scheduled to take a class and assigned a coach or monitor aid in getting the seminar started. The monitor is a man who has already given the course, and he can do most of his coaching by telephone or letter, after the first two sessions. Generally, each leader is asked to monitor one or two groups after carrying his own group of supervisors through a course.

The "buddy" system of recruitment, training and coaching of monitors is used because it permits rapid expansion of the program without imposing too great a load on any of the personnel concerned. This is important for the organizational health and longevity of any such voluntary service which is expected to continue over a long period of time—long after the initial enthusiasm and warmth of the originators

Typical Methods Improvements Installed By City of Philadelphia Supervisors After 14 Hours Of *SAM* Work Simplification Training

DEPT.	OLD METHOD	NEW METHOD	CAPITAL COST OF INSTALLATION	ANNUAL SAVINGS EXPECTED (DIRECT LABOR & MAT'L.)
Truck & Auto Repair	Triplicate repair order had individual delivery of yellow copy to stock room.	Yellow Copy now delivered to stock room when requisition is presented by repair man. Over 3,000 repair order deliveries per year at 3 minutes each are eliminated.	None	$ 300.00
	Clutches repaired on Rio trucks.	Special widened jig made for clutch change. Time reduced from 14 to 4 hours per job.	None	Not evaluated
	(a) Repair man walks 4 round trips each day, 500 feet each to pick up repair order @ 4 min. per trip.	(a) Dispatcher gives repair order to truck driver to deliver with truck 785 hr. = 1.87 hr.	None	1,476.00
	(b) State inspection.	(b) Consolidation of duties elimination of helper standing by—saving 2/3 hr/truck —480 vehicles/yr. Saving of time of driver for inspection one fourth of the time.		598.00 169.00
	(c) Trucks requiring replacement parts are kept in shop awaiting parts.	(c) Trucks released to work until parts arrive. 150 truck days/year at $10.00 per day, less 24.00 per extra delivery.		1,320.00
Police Auto Repair Shop	(a) Call City Hall for a repair order number.	(a) Dispatch clerk now has own bank of numbers. Eliminates 2400 calls per year per clerk responses 2 min. each. 2400 phone calls 3c/ea.	None	160.00 160.00 72.00
	(b) Supervisor inspects all jobs for estimate.	(b) Skilled repairmen inspect job: estimated/savings 10c hr.		60.00
	(c) Supervisor writes requisitions for replacement parts.	(c) Storekeepers write requisitions saving 45c/hr. Pay difference 600 hrs./yr.		540.00
Communications Line Crew	Truck and cart used one to each job.	Truck not assigned to any one job, but kept available all day for deliveries. Truck released approx. 400 hrs./yr. @ 2.00/hr.	None	800.00
Communications Installations	Men assigned to phone installation work as jacks-of-all-trades.	Specialization of each man for tasks such as wiring, phone box, dismantling, etc. Saves 20/min./man/day.	None	880.00
Mason	Rubble from cement walks torn up for repair was carted away to dump.	Rubble now reused as part of aggregate. Savings in loading and unloading time for 4 men average of 1 hr./day.	None	1,773.00
Maintenance Trade	Scheduling often had different trades on same job at same time.	Use of scheduling and activity chart keeps trades from overlapping. Estimate saving of 15 men per day per 52 men @ 1.80/hr.	None	2,000.00 6,628.00
Sanitation	All garbage collection crews sent out at same time each day. Collectors have to wait for wagon to return from dump.	Crews starting time staggered so a collection crew has an empty wagon waiting as soon as needed.	None	100,000.00
	Garbage is cooked for use by farmers.	Repair of valves increased steam pressure, reduced cooking time 1 hr. per load.	None	2,000.00
	Garbage collection cans quickly deteriorate.	Investigating Aluminum Pails.	None	Not evaluated
	Sweeping of streets after trash collection. Sweeping crews follow trash wagons.	Sweep the following day to avoid waiting for trash wagons. Sweepers move 25% faster.	None	75,000.00
Dept. of Bldg. Inspection	Hand copy card describing property.	Rent microfilm service.	None	9,000.00
Water Dept.	Water Meters warehoused by City.	Eliminate warehousing; merely issue permits.	None	Not evaluated

might have dropped down to room temperature.

Communications are from the seminar leader to the monitor, and from the monitor to the Work Simplification Chairman. The Chairman arranges all seminar groups and their meeting places, supplies the printed matter needed for each training group. He also makes sure that the operational "ground rules" are observed.

The attached list indicates some of the typical cost saving proposals, and results of the Philadelphia project. All savings are calculated only on the actual labor or material saved. No overhead or burden savings are claimed, although in some cases these are doubtless sub-

Audited savings to date, for six groups, are well over $183,000 per year. Unaudited projects, still to be verified, are in excess of $69,000 in annual savings. None of them required any capital expenditure.

To achieve this result, the Philadelphia SAM Chapter spent $65.00 in cash, and less than one man hour for each $1,000 of annual saving obtained.

As any practitioner of Work Simplification will recognize, the morale benefits achieved by the program are even more valuable than the dollar savings. The following unsolicited letter sent in by one of the students in the supervision class:

"You have no idea what this class has meant to me. For 10 years I have been working at the same thing day after day. Not that there was anything wrong with the job, but perhaps I was not satisfied with doing the same thing for so many years with no future. This has been the first and only time the green light has been on for me, and many more like me I suppose; it took me all this time to learn what it cost to operate a truck with men and quite a few other things that I am very glad to know about . . . From what I could see, every man present was very enthusiastic at all times. I, for one, looked forward to every Tuesday night."

With such a program as this SAM members have a rare opportunity for public service. This type of program could be sponsored by all Chapters, as an aid to both local and state governments. In fact, this back door approach —by tackling the first-line supervisor— could be the key to aiding the non-political industrial engineer to exercise his scientific management training in the field of government. In Philadelphia, at least SAM members are helping to make a noticeable dent in the high cost of government! END

For the Advanced Industrial Engineer . . .

Creative TIME STUDY And METHODS

A stimulating collection of articles on the latest developments in the Industrial Engineering field, compiled from papers presented at the 1954 SAM-ASME Time Study and Methods Conference

Table of Contents

THE SELECTION OF INDUSTRIAL ENGINEERING PERSONNEL
Charles A. Thomas

TRAINING OF INDUSTRIAL ENGINEERING PERSONNEL
Nicholas L. A. Martucci

TOMORROW'S MATERIALS HANDLING METHODS (PART I)
Matthew J. Murphy

FACTORS IN TODAY'S MATERIALS HANDLING METHODS (PART II)
Robert S. Rice

MATERIALS HANDLING: THE 1960 PICTURE (PART III)
Carroll W. Boyce

STANDARDS PERFORMANCE TIME FOR FORK TRUCKS
Oswald S. Carliss

PRIVATE ENTERPRISE AT NIAGARA FALLS
Earle J. Machold

MEASUREMENT OF MAINTENANCE LABOR
John S. Sayre

MEASUREMENT OF OFFICE OPERATIONS
J. Henry Parker

PREDETERMINED TIME STANDARDS IN THE NEEDLE TRADES
Miss Lea Terruzzi

PREDETERMINED TIME STANDARDS IN FABRICATION AND ASSEMBLY
Helmut C. Geppinger

FREEDOM WITHIN ENTERPRISE
The Honorable James C. Worthy

AUDITING OF WAGE INCENTIVE PLANS
D. F. Howe

COST REDUCTION INCLUDING WAGE INCENTIVE PLANS
Garland C. Martin

AUTOMATION: ADVANCES IN AUTOMATIC PRODUCTIONS
Robert T. Collins, presented by Robert Randel

ADVANCES IN STATISTICAL CONTROLS
Mel Hurni

DOMESTIC LEGISLATION VIA INTERNATIONAL TREATIES
W. L. McGrath

PRODUCTIVITY WITHOUT WAGE INCENTIVES
Robert E. Pomeranz

PRODUCTIVITY WITH WAGE INCENTIVES
Robert Jones

THE INDUSTRIAL ENGINEER AND LABOR CONTRACT CLAUSES
G. Jay Anyon

CREATIVE ARBITRATION
The Reverend Dennis J. Commey, S. J.

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New Management Writing . . .

LABOR MOBILITY AND ECONOMIC OPPORTUNITY

Co-published by Wiley and The Technology Press of The Massachusetts Institute of Technology. 1954. 118 pages. $3.50.

This book consists of seven essays by E. W. Bakke, G. L. Palmer, D. Yoder, P. M. Hauser, C. A. Myers, and C. Kerr. It makes available for the first time the results of sustained research and thought by authorities in the field of labor mobility. Factors affecting occupational, industrial, and geographic mobility in individual labor markets and in specific groups in the labor supply are investigated and summarized. The book presents information on particular local labor markets, and suggests insights into the operations of other labor markets.

EFFECTIVE LEADERSHIP IN HUMAN RELATIONS

By Henry Clay Lindgren. Publisher: Hermitage House, Inc., 8 West 13th St., New York, N. Y. 287 pages. $3.50.

Effective Leadership is a triumph of technique and content over the natural apathy this department is rapidly feeling on human relations books. It is one of the best of its kind, and they become more and more rare with every publication date. First of all, Dr. Lindgren is a good writer; he says just what he means to say, and comes directly to his various points. As much as possible, he avoids the already-archaic phrases and words that burden and stultify so much human relations literature. His examples are brilliant, shrewd and well-handled. His coverage is thorough; his discussion of the various types of leaders is almost classic. And Henry Lindgren's portrait of the "human relations artist" which is in his opinion the coming management man, is fabulous.

MODERN OCCUPATIONAL MEDICINE

Edited by Dr. Allan J. Fleming, and Dr. C. Anthony D'Alonzo. Dr. John A. Zapp, associate editor. Published by Lea & Febiger, Philadelphia.

A comprehensive guide to the planning and functioning of industrial medical programs. Originally planned as a guide for Du Pont's own physicians, the authors present information that will be useful to physicians, executives, safety engineers and chemists throughout industry. The book not only provides a complete review of all phases of occupational medicine, but presents substantial findings based on original work in specific fields. Simple research methods, when properly applied, can prevent many of the pitfalls of the past. Adequate health care is the central theme of the book. It presents data that will permit plant managers and other industrial executives to evaluate the adequacy and efficiency of their medical services. Specific information is given on administration, functions, location, personnel, layout, equipment, medical history, physical examinations, and medical records.

UNIVERSITY EDUCATION FOR ADMINISTRATION IN HOSPITALS

A Report of the Commission on University Education in Hospital Administration, 1954. Write to the American Council on Education, 1785 Massachusetts Avenue, Washington, D. C. 199 pages. $3.00.

While this volume has obviously a limited appeal for SAM's subscribers, still for those students interested, it provides an unusually rich compendium of information. Such programs are hardly more than ten years old, for instance. But while they are very young, it is general lay knowledge that this area of endeavor and management is an important one, and the lack of personnel and educational attention it has attracted throughout the nation amounts almost to scandal. Here is a book giving all the facts, and telling where supplementary information may be found. Of its kind, the book is unique.

A GERMAN-ENGLISH DICTIONARY OF AUTOMATIC CONTROL TERMS

By D. W. Pessen. Published by The American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. Reprints will be available until July 1, 1955.

Since the science of automatic control is a relatively new one, most of the terms associated with it have only become crystallized during the last decade. It is, therefore, no wonder that existing German-English scientific dictionaries include practically no automatic control terms. This state of affairs has made it difficult for the English-speaking reader to follow the ever-increasing German literature on the subject. To fill this gap is the purpose of this dictionary. Its aim is not to supplant existing German-English scientific dictionaries, but rather to supplement them. This dictionary makes no pretense of being absolutely complete, and its author makes no pretense of being a lexicographer. The dictionary is merely a list of terms which the author has come across while reading and translating German articles on automatic control. Some of the terms found in this dictionary may have no direct relation to the automatic control field, but since they seem to be used repeatedly in articles and papers on the subject, it was felt that their inclusion would be justified.

THE FOUNDATION OF STATISTICS

By Leonard J. Savage. Publisher: John Wiley & Sons, Inc., 440-4th Ave., New York 16, N. Y. 294 pgs. $6.00.

In this work Leonard J. Savage concentrates on the human, or personal, aspect of statistical probability. He believes that the purely personal factor is vital in decision, and in a cogent defense of this viewpoint he offers a theory of decision-making under uncertainty in which both statistics and probability are imbedded in a general system of rational behavior. The extent to which *The Foundations of Statistics* emphasizes the role of economic behavior in statistics makes it unique. The book is organized into 17 chapters. The first 7 chapters are concerned with foundations at a relatively deep level. These pages develop, explain, and defend a certain abstract theory of the behavior of a highly idealized person faced with uncertainty. Building on a developed theory of personal probability, Savage introduces and develops the concept of utility, as posited in modern form by von Neumann and Morgenstern. Observation and experimentation, and the types of problems dealt with by statistics, are then treated in terms of utility and personal probability.

END

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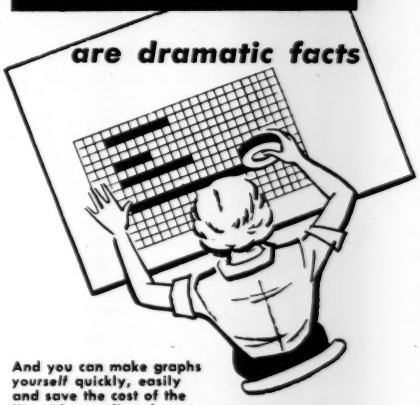

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